ELECTRICAL REVIEW

[ILLUSTRATED.]

A WEEKLY JOURNAL OF

ELECTRIC LIGHT, TELEPHONE, TELEGRAPH AND SCIENTIFIC PROGRESS.

(*Formerly Review of Telegraph and Telephone.*)

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National Electric Light Association.

First Day's Proceedings in Baltimore, by Telegraph to the "Review."

AN ENTHUSIASTIC GATHERING OF WIDE-AWAKE MEN.

(*Special Baltimore Dispatch to the* ELECTRICAL REVIEW)

The rapidly increasing interest in electric lighting is nowhere more clearly shown than in the growth of the National Electric Light Association, organized in Chicago one year ago, and which commenced its third meeting in Baltimore on Wednesday of this week. The call for the first meeting which the ELECTRICAL REVIEW alone, after consulting with several of its electric lighting friends, assumed the responsibility of publishing, appeared editorially in its issue of January 17, 1885, the first meeting being held on February 25. At this meeting a small membership in the association was secured, the attendance, however, numbering about ninety. But the organization had been effected, good officers selected, and from that date the interest continued to grow; the second meeting in New York, last August, showing a greatly increased membership, and at the meeting now in session in Baltimore the attendance is much larger than at any preceding gathering, and the interest in the proceedings much more pronounced. In addition to the active and prominent operators of electric-light plants, the parent companies are largely represented, while the dealers in supplies, carbons, wire, globes, etc., engine and boiler and furnace manufacturers, are present in intelligent and persuasive force. The first day's proceedings we give in this issue, and in our next edition will appear the complete report with the papers presented by the committees appointed to report to this meeting.

The following officers of the association were present when the president called the convention to order at 12 o'clock, Wednesday: President, J. F. Morrison, Baltimore. Vice-presidents—H. M. Cleveland, Hartford, Conn.; J. H. Yarbrough, Nashville; E. R. Weeks, Kansas City. Secretary, A. G. Rheinhard, Baltimore; treasurer, Chas. Cooper, Brooklyn. Executive Committee—Geo. S. Bowen, Chicago; William Hochhausen, New York; Gilbert Donaldson, St. Paul; Frank Ridlon, Boston; John R. Fletcher, Dayton, Ohio, and George O'Connor, New Orleans.

The convention assembled in the large dining parlors of the Carrollton Hotel, where excellent arrangements for the comfort of the delegates had been provided. The roll-call developed a greatly increased attendance of members, whose names we shall publish in full with the detailed report,

(*Continued on page 5.*)

The Electro-Megaloscope.

ANOTHER AID TO THE PHYSICIAN AND SURGEON FURNISHED BY ELECTRICITY.

Medical electricity is attracting more attention every day. New instruments of value are being designed and invented in this country and abroad, with a marked rapidity, something novel and useful appearing nearly every week. The REVIEW illustrates two views of the battery used with the "Electro-Megaloscope," on this page, and translates the interesting description of the method of using the same.

At the last meeting of the Societe Internationale des Electriciens, Doctor Boisseau du Rocher presented a set of instruments for the direct optical examination of the deep cavities of the human body and especially of the bladder, rectum and stomach.

They have already been made the subject of communications, first to the Academy of Sciences, and later to the Academy of Medicine (July 27 and 28, 1885).

We call to this apparatus the particular attention of our readers as it is interesting for divers reasons—as to mode and intensity of light by meansof minute incandescent lamps—as to source of electricity, as to mechanism, as to optical arrangements and for a general desire, from a medical point of view for the establishment of correct diagnosis.

This last point was eloquently dwelt upon by Dr. Boudet, of Pars, after the reading of the communication of his confer.

The instrument, proper called by a generic name, megaloscope, gives, in effect, the solution of a question which, since the time of Nelaton, has been the object of numerous and unfruitful researches. To see perfectly the membranes of the human cavities in the living subject by means of a sound of a diameter of six millimeters (about one-fifth of an inch), and of a length of 0.5 meter (nearly twenty inches) seems incredible.

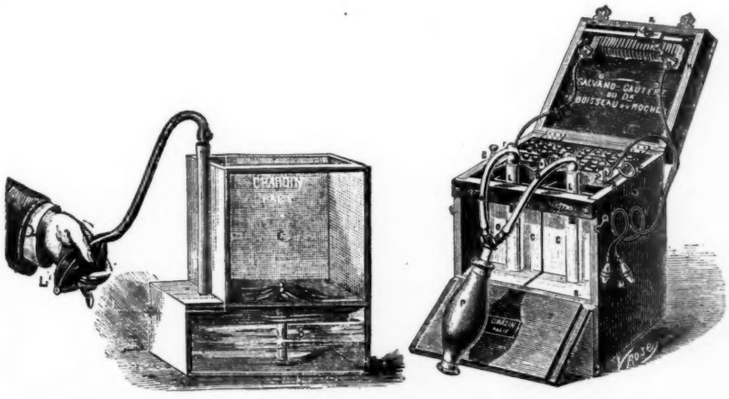
The megaloscope is composed essentially of a sound, the mechanism of which differs with the organ examined.

The inventor rendered praise to the workmen whose handiwork has been the means of obtaining a source of light so intense and so perfect in the form of lamps of only four millimeters (one-fifth of an inch) in diamter.

This small diameter was necessary to admit of the lamps being placed in a lantern fixed at the curved end of the sound and thus obtaining the light direct upon the organs. These lamps constructed for two bichromate of soda elements are sufficiently strong, notwithstanding their small size, to resist the current furnished by three and four elements, which permits us to obtain without fear of damage a remarkable luminous intensity.

The Battery.—The battery employed makes use of air pressure for the circulation of the exciting liquid.

It has already been presented by Dr. Boisseau du Rocher before the Academy of Medicine at its meeting of February, 24th, 1885, for galvano-caustic. We give the two accompanying cuts of this battery.



FIGS. 1 AND 2.—VIEWS OF THE BATTERY USED WITH THE ELECTRO-MEGALOSCOPE.

It is formed of two compartments communicating by means of a tube which enters the lower one. The air forced into this reservoir of exciting liquid by a bulb fixed to the end of another tube causes the liquid to rise into the upper vase to a greater or less height, easily regulated, so as to come into contact with the zincs and carbons. As the air issues out, the liquid falls back by its own weight into its reservoir. We can associate a variable number of elements in which the air tubes are then branches from a single bulb. In this case a modification of the distribution of air is necessary. In order that this air shall pass to the respective reservoirs in equal proportions in such a manner that the liquid rises in all with equal speed, it is indispensable that the air be fed through a reservoir in which the air is first compressed by the bulb.

Modifications of form and dimensions permit the employment of this battery for different purposes, medical and industrial. For this latter purpose, such as for domestic electric lighting, the reservoirs of liquid are given dimensions in proportion to the number of hours of work desired. For medical use the pile is of small size and perfectly watertight, the liquid being contained in a reservoir shut off from the rest of the box when the pile is not in operation nor can it slop over. This is essential in apparatus of this nature. A regulator fixed upon the cover of the box permits the easy graduation of the current. The operator has at his disposal two means of regulation, in reality, the forcing of air in greater or less quantities into the reservoirs of the exciting liquid, and, on the other hand, the regulator proper. In fine, the disposition is such that with the liquid enveloping the elements entirely the graduation may be obtained by means of the regulator alone.

The field of observation is very limited. It is very evident that it is impossible to properly appreciate a wound or lesion unless we have facilities of examining it in its entirety and in its relation to the healthy surrounding parts. The apparatus of which we speak, possesses this desideratum in permitting the observation of the considerable field of about six inches in diameter; whilst the interior diameter of the sound which carries the object glass must be reduced to about one-fifth of an inch for a length of nearly 23 inches. The extent of surface observed is, moreover, the greater, the more spherical the cavity viewed. The author has called the optical principle involved in these instruments *megaloscopy*, whence the name *megaloscope*.

Now, a few words as to the mechanical part. The sound is straight or curved, according as it is designed for the bladder of the male or female. The total length of the instrument (the telescope not being included) is 19½ inches, for reasons not necessary to explain the sound for the rectum has a length of 27½ inches. It is furnished with a special dilator with arrangements for washing the membrane.

The megaloscope for the stomach is formed of two sounds doubled the one upon the other; the one movable and the other fixed and curved in such a way as to permit examination in the sitting posture without pain or fatigue to the patient. The movable sound is attached by exterior mechanism. The sounds are manufactured by Mathieu and the batteries are made and mounted by M. Chardin. From the extended description given by Dr. Boisseau du Rocher when he presented the matter before the Societe des Electriciens it convinced us, and we believe all his hearers, that his instruments are entirely different from those of M. Trouve', which, in the opinion of persons competent to judge are constructed without much respect as to the requirements of anatomy or physiology. His claims appear to us quite barren.

Upon this ground we are not willing to grant M. Trouve his fame, based upon the admiration of one or two German physicians. In the tribune he has invoked the testimony of Dr. Muller, who has published a small treatise, which M. Trouve distributes besides as a prospectus. This is easily understood.

We read from it the following description of the optical arrangement:

"M. Trouve used, first, an ordinary plane mirror, inclined at the angle of 45°; later he substituted a prism of total reflection. In 1878 he replaced this last by a magnifying prism which, in addition to the total reflection gives an enlargement of the image as 2 to ½". It is not necessary to insist further upon the manifest difference to the non-prejudiced between the new principles so happily put into practice by Dr. Boisseau du Rocher and that of M. Trouve, of which the least of its faults is in giving a very limited field and in showing as totally deformed image; a plane surface having the aspect of a map of the world.—*Em. Dieudonne, in La Lumiere Electrique.*

The Dorsett Conduit System as Used in Chicago and Detroit.

We have already published in the REVIEW short descriptions of the Dorsett subway, and are enabled to-day to illustrate for the benefit of our readers the system complete, as it is being used in the West, particularly in Chicago and Detroit. It is the only inclusive system in practical use to-day, it is stated, giving perfect satisfaction in all respects to the electric light, telephone and telegraph companies who are using it. The following will give a general idea of what is now in practical use in Chicago:

"The object of the Dorsett system is to facilitate the laying and distribution of the conductors throughout a city, or any part of the same, to the better insulation of said conductors, and the prevention of inductive and other injurious effects arising from the close proximity of circuits for different purposes, such as telegraphing or telephoning on the one hand, and electric lighting on the other. The system is comprehensive and complete, in so far as it provides for the economical laying and working of all the circuits which the present needs of business and communication require; in other words, it provides for the running in close proximity of circuits for carrying the strongest and most intense currents as well as those for carrying the most feeble electrical impulses, such as are produced in the operation of telephony, and this in such manner that there will be no danger to any circuit from such proximity, while all are brought within ready and easy access.

"The system comprises main and branch pipes, or conduits, in which the conductors are carried. The main consists of three separate and independent pipe lines, one containing such wires as are required for communication with distant points or other cities, and which are designated as trunk lines; another pipe contains the wires of circuits used in local communication and intercommunication, such as telephone lines, fire and burglar alarm circuits and the like; while the third contains the circuits used for electric lighting, transmission of power, or those industrial or domestic applications of electricity which require powerful currents. The lines are run through the streets of the city at such a distance below the surface as will insure protection against bending or injuries from repair of the streets, subsidence of the surface soil and the like. Generally, and whenever convenient, the lines are run midway between the buildings on either side of the way, and with the trunk line between the other two.

"At the intersection of the streets the three lines are run into what are termed manholes—that is, subterranean chambers large enough to permit a man to enter them for obtaining access to the pipes or conductors therein. These manholes are constructed in a way to keep out water, moisture, moist air, sewage, illuminating and sewer gases, and other matter, and are provided with suitable detachable double covers. The pipes pass through their sides and the wires can be carried from one pipe to another as as may be required. Between the manholes and along the blocks or squares are numerous subterranean chambers, which are designated manholes. These are placed as nearly as practicable opposite the dividing lines between the buildings, so that in places where the buildings are of about the same frontage two manholes are required for each group of four houses. The handholes are for the purpose of running branches from the two pipe lines on either side of the trunk line, which latter does not pass through them. They are much smaller than the manholes, though constructed on the same principle. The pipes containing the signaling and those with the electric light wires enter these boxes, and one or more of the wires or branches from the same are brought up to a higher level and taken off into smaller branch-pipes to the buildings. Four of the smaller pipes run from each handhole, one to each of the four nearest buildings, and in laying the handholes and branches it is desirable to locate the former as near as possible to each other, in order that all the branches may be placed in laying in one small trench. Of the two branch pipes that run to each house, therefore, one contains the wires of an electric-light circuit, the other those of a telephone or other signaling circuit. In the case of the former there may be one or more leading and return wires for the same house circuit, or the leading wire or wires to one house, and the return wire or wires from another. This is a matter of choice, and not essential to the main features, that of isolating the electric-light circuit from the other.

"The material is an insulating compound containing coal-tar, paraffine, silicious sand, pulverized ashes and cinders, oxide of manganese and ammonium chloride in certain proportions. The joints between the sections of the pipes may be either of metal, or the entire conduit may be made from the insulating material alone. The manholes and handholes are also to be made of this material.

"Insomuch as the mains are buried deep and are of comparatively large size, they are made of the insulating compound alone, but it is extremely undesirable to bury the branch pipes deep. In fact they should be but little below the surface or flagging of the street, and as they carry usually only one or two wires they should be made quite small. Instead of making them, therefore, of the compound alone they use iron pipes, which are filled with the compound, through which passages are formed for the wires. By this means the requisite strength and insulation are obtained. There are no leaks.."

Our Western correspondent and consulting electrician recently summed up the claims of this system as follows:

"1st. The material of which it is constructed is a thoroughly good insulator.

"2d. It is manufactured under a hammering compression, to a consistency which renders it completely and perfectly impervious to all forms of gas, moisture, silt and sewage.

"3d. Its crushing strain, as certified by a Government officer (J. E. Howard, at the Watertown, Mass., Arsenal in 1883), is 5,500 lbs. to the square inch.

"4th. A pressure of 180 lbs. has been shown to be incapable of forcing the least moisture through an inch of the material.

"5th. Pipes in Chicago which were not below frost during the past winter, with the thermometer 27° below zero, show no damage to the city's wires or conduits by this extreme cold.

"6th. The Dorsett pipe is not a new invention, but an adaptation of the Dorsett sewer pipe, which had been in use for many years before the present underground enactments were passed, and samples of these pipes which have been unearthed for the purpose, after years of immersion and soaking in all sorts of sewage—in fact all those destructive elements which have proved fatal to so many underground insulations and pipes—and these have shown no perceptible change either from a chemical or mechanical stand-point." And in closing says:

"With all these advantages in its favor, it certainly would seem that there is less risk of failure from disintegration, and better assurance of electrical success in the use of this material and system, than in the adoption of any one of the many untried theoretical plans which are to-day clamoring for preference."

Mr. Geo. W. McNulty, C. E. and M. E., who is one of the best known mechanical experts, visited Chicago recently and examined this conduit and the material of which it is constructed, and in his report says: "The Dorsett artificial asphaltum concrete is a durable constructive material and in every way well adapted to the purposes for which it has been used."

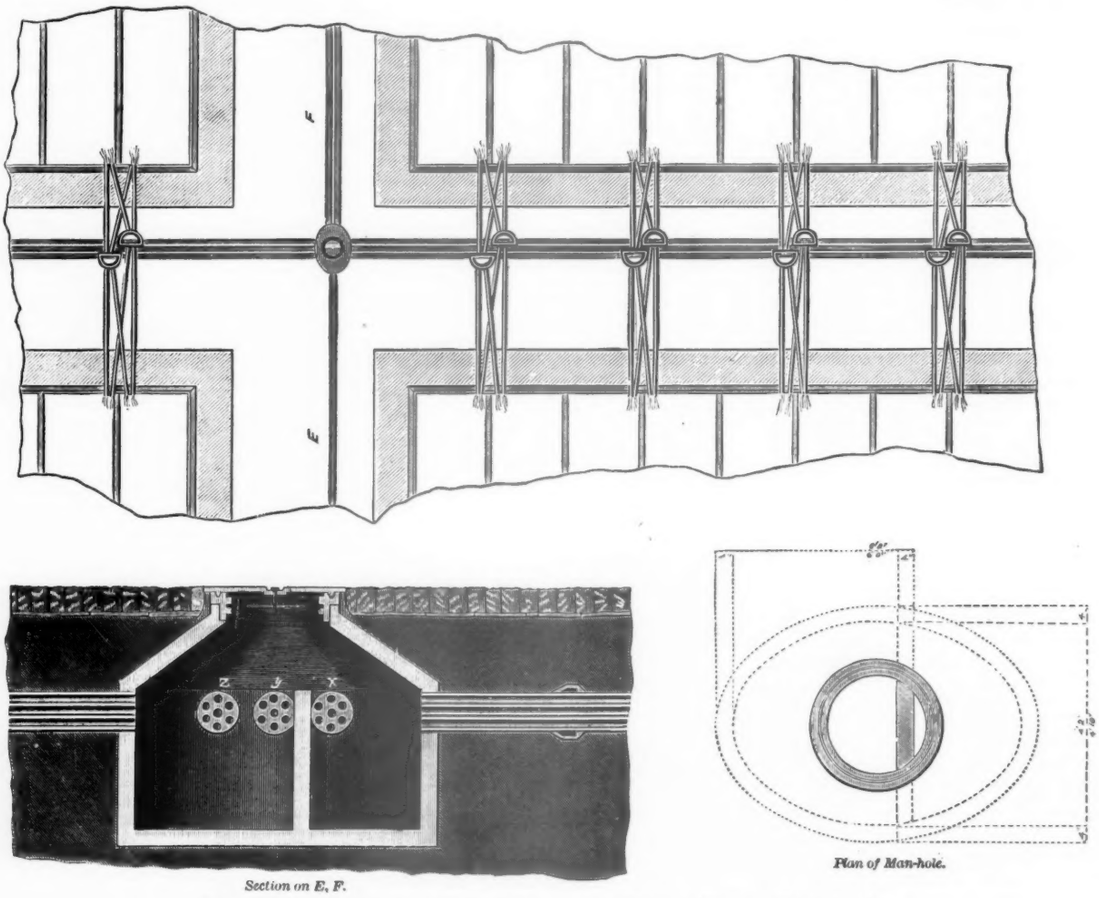


FIG. 1.—DORSETT CONDUIT AS USED IN CHICAGO AND DETROIT, PLAN OF MANHOLE, &C.

More About the Pan-Electric.

COMMENTS OF THE DAILY PRESS—ACTION TAKEN BY CONGRESS.

There has been some very interesting reading in the columns of the daily press concerning the Pan-Electric Telephone Company, and the prominent Government officials who are numbered among its stockholders. Although these officials are the greatest of Democrats, yet the organs of that party have not hesitated to express severe and pointed denunciation of their action in this case. The New York *Sun* reviews the whole history in the following caustic language:

After a long examination of the testimony regarding the Bell patents, in which not a single new fact or a single bit of new evidence had been presented, and with the circumstance before his eyes that three justices of the Supreme Court—Mathews, Blatchford and Gray—, and four Circuit judges of the United States—Lowell, Bond, McKenna and Wallace—, and a number of District judges with them, had all held, after a careful and protracted hearing of the same testimony, that the Bell patents were valid, Mr. Lamar, either out of some deplorable intellectual eccentricity, or from a willingness to oblige Mr. Garland, or from some other unjust and unjustifiable reason, reported that, in his opinion, a suit should be brought in the name of the United States, because, he said, no private suit could avail to set aside a patent that had been fraudulently procured. Yet, in the face of this surprising and unaccountable declaration, the Revised Statutes of the United States (Section 4,920) expressly provide that any defendant who contests the validity of a patent shall have the right to prove that the patentee "had surreptitiously and unjustly obtained a patent for that which was in fact invented by another"—a provision which covers the whole case, and expressly contradicts and ridicules Lamar's labored and irrational argument.

Here, then, we have the Secretary of the Interior uniting with the Attorney-General to employ the name, the authority and the money of the United States to institute and carry on, in their own private interest, and for their personal enrichment, a litigation against a patent granted by the United States Government. It matters not to them that both District Courts and Circuit Courts of the United States have repeatedly declared that they have no good ground of action, and have granted injunction after injunction; the Attorney-General and the Secretary of the Interior propose to array the Executive against the Judiciary, and to bring the Treasury of the United States to their aid in overawing the courts and overthrowing justice, that the conspirators may become rich beyond the wildest dreams of avarice.

Another point, which should not be overlooked, is the fact that there is no legal authority which allows the Executive to bring the proposed suit, without an act of Congress previously obtained. This was well known to the speculators, and they last year undertook to procure such enabling legislation; but their bill failed to pass the Senate. Now, however, time is short, and they do not wish to wait any longer. So great is their impatience that the Attorney-General allows a suit to be begun without any shadow of power, and the Secretary of the Interior, likewise a distinguished lawyer and statesman, seconds the motion, and endeavors to drag the President and the whole Administration into the same deadly slough.

This is indeed an official scandal of the first magnitude, overtopping everything else of the kind that has ever been transacted since this Nation has been in existence.

The history of the formation of the Pan-Electric Telephone Company is given in the New York *World* as follows:

"The Pan-Electric Telephone Company has $5,000,000 capital stock, divided into shares of $1,000 each; these shares were held originally by the following named persons.

J. E. Johnston	$500,000
Isham G. Harris	500,000
A. H. Garland	500,000
Casey Young	500,000
J. D. C. Atkins	500,000
J. Harris Rogers	2,000,000
The Company	500,000

"It will be observed that these five gentlemen each held one-tenth of the stock, but knowing the vagaries of inventors, they required that another tenth, making a majority, should be put under their control, so that they could have the business in their own hands. This $500,000 worth of company stock belonged to the holders of the other shares in proportion to their holdings, but was controlled by the Board of Directors and could be used in any way it saw fit. These directors were old politicians and had not forgotten that notable saying of Oakes Ames as to 'placing stock where it would do most good.'

"The Board of Directors of the company was composed of Joseph E. Johnston, Isham G. Harris, A. H. Garland, Casey Young, J. D. C. Atkins, and J. Harris Rogers. The officers were: Joseph E. Johnston, president; Isham G. Harris, vice-president; Casey Young, secretary and treasurer; A. H. Garland, attorney; J. Harris Rogers, electrician.

"Messrs. Johnston, Harris and Young were made an executive committee with all the powers of the full Board.

"The telephone company was chartered by the State of Tennessee, with its principal office in Memphis and another in Washington City. Under the laws of that State as to corporations, all that was necessary to be paid in of the five millions capital stock was the fee to the Secretary of State for using his seal, amounting in this case to $4.50.

"The agreement by which these gentlemen became the owners of the Rogers patents was that they should put up what money was necessary to take out patents, manufacture telephonic instruments and to put up experimental wires.

"All this work was done in the summer of 1883.

"In November of 1883 the incorporators of the Pan Company were assembled in Washington, and as the experiments had been pronounced successful, the directors determined to commence operations In the meantime Mr. Rogers had disposed of one-third of his interest, $833,333, to Col. Robert F. Looney, a lawyer and speculator of Memphis, Tenn., and he was added to the Board of Directors and took an active part in its management. The directors determined to issue licenses to local companies, that is, sell territory in which the Pan-Electric inruments were to be used.

"The terms upon which these sales were to be made were agreed upon and are as follows: 'Forty per cent. of the capital stock of the local company to be held by the Pan Company; all instruments to be furnished by the Pan Company at a stated price. A royalty of $10 per annum to be paid by the local company on each instrument; a bonus in cash to be paid by each local company.

"Under these conditions eight local companies were formed: one for Pennsylvania, with the Hon. Robert Klotz, formerly in Congress, as the principal promoter; Gen. Frank Armstrong, now Indian Inspector, being the secretary. One in Baltimore, the Hon. Eli J. Henkle, formerly in Congress, being the promoter, to which the States of Maryland, Virginia and the District of Columbia were sold. One in St. Louis for Missouri. One in Wisconsin. One in Tennessee One in Alabama, of which Gen. Upshur, now Chief Clerk of the Indian Bureau, was the promoter. One in Texas and one in Louisiana. The two first-named companies were not required to pay any bonus, but in all their contracts the Pan-Company agreed to defend the validity of its patents at its own expense."

This telephone matter, which has been filling the columns of the daily press, seems to have finally reached such proportions as to command the attention of Congress and at a morning session Mr. Hanback of Kansas, raised a lively breeze in the House when he rose to a question of privilege and sent to the clerk's desk to be read an editorial from "The New York *World*" entitled "The Telephone Scandal" Mr. Breckenridge, of Arkansas, promptly made the point of order that there was nothing in the editorial which reflected upon Mr. Hanback in his capacity as a Representative. The Speaker asked if this statement was correct and Mr. Hanback admitted that it was, but insisted that the article and other editorials relating to the same reflected upon the House of Representatives, and therefore the charges ought to be investigated.

Mr. Dunn, also of Arkansas, maintained that the question of privilege must be decided by the Speaker after personal inspection of the matter submitted, so that the records of the House might not be made "a vehicle to cart scandals before the country."

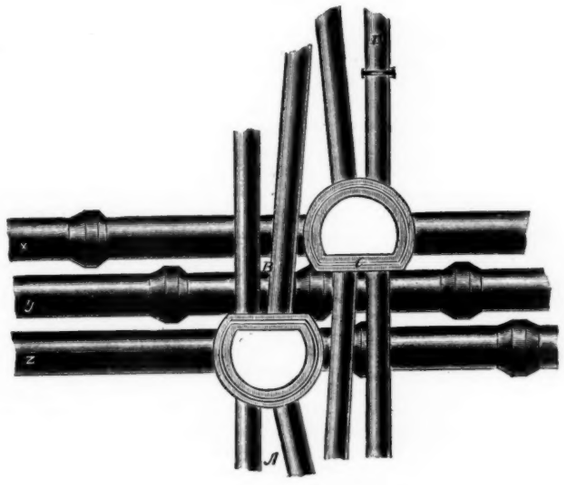
The Speaker ruled that as the editorial did not reflect upon Mr. Hanback he could not base a question of privilege upon it.

Mr. Hanback then offered the following:

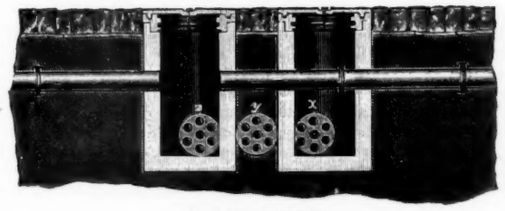
Resolved, That the Committee on Expenditures in the Department of Justice be empowered to make full inquiry into any expenditure on the part of the Government relative to the rights of the Bell and Pan-Electric Telephone Companies, and, for the purpose of this investigation and to the end that the people may be fully advised, the committee is granted the right to send for persons and papers; all expenses to be audited and accounted from approved vouchers, and when so approved to be paid out of any moneys in the Treasury not otherwise appropriated.

The Speaker thought that this was not a privileged resolution but simply one of inquiry.

A short discussion followed in the course of which Mr. Randall declared that while he did not think the matter was one with which the House was required to deal, he was opposed to throwing any obstacle in the way of the fullest investigation of any matter concerning the public welfare. The resolution was therefore adopted.



Plan of mains, laterals & hand-holes.



Section on A, B, C, D.

Details of Lateral Conduit.

FIG. 2.—PLAN OF MAINS AND LATERALS OF THE DORSETT CONDUIT.

Cannot Tax the Poles.

The case of the Western Union Telegraph Company for failing to pay a tax on poles and which has been pending in the court of criminal correction in St. Louis, Mo., for nearly a year, was decided February 3d, by Judge Noonan. A city ordinance provides that the city can levy a tax of $5 per pole on all poles erected within the limits of telegraph companies. When the collector attempted to collect this tax the company refused payment, and a prosecution was at once instituted by the city in the police court. When the matter came up before Judge Cady he discharged the defendants on the ground that the ordinance was unconstitutional and therefore invalid. The city appealed from the decision to the court of criminal correction, when Judge Noonan, affirmed Judge Cady's decision on the same ground. He holds that the city can regulate the erection of telegraph poles, but cannot levy a special tax of $5 per pole. The case will go to the court of appeals.

Gas *vs.* Electricity in Toronto.

In February, 1883, Mr. Simon Hamburger obtained the control of the "Hochhausen" patents for Canada, and with the assistance of Mr. E. S. Cox, a well-known broker of Toronto, organized the Toronto Electric Light Company, Limited. On the 17th September, 1883, the company started with 55 arc lights, and, notwithstanding the bitter opposition of the gas company (a monopoly of 36 years' standing, and with a surplus of $700,000 in excess of their capital of $1,000,000), by the hardest and most energetic labors these gentlemen succeeded in obtaining the necessary capital required, as also a contract from the city for 93 lights. To-day the company has one of the most complete plants in America, fully equipped to furnish 425 arc lights.

On the 16th of last month the city of Toronto entered into a five years' contract with the company for the supply of 200 lights, which, together with their private lights, gives them a business of 350 lights.

The fight for this contract continued unceasingly since May last, and, notwithstanding the fact that the Consumers' Gas Company reduced the price of their lamps from $24.35 to $20.50, the citizens of Toronto, through their aldermen, have demanded an increased number of electric lights in their principal streets.

The struggle has been a hard and long one, but the results should be satisfactory, and should in a measure repay Messrs Hamburger, Cox and the directors of the company. Who will score the next victory of electricity over gas?

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GEO. WORTHINGTON, - - - Editor.
CHARLES W. PRICE, Associate "
LOREN N. DOWNS, - President.
C. C. HASKINS, GEO. A. HAMILTON, JOHN W. BEANE } Consulting Electricians.

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We invite correspondence from Electricians, Inventors and the Telegraph and Telephone fraternity and those engaged in Electric Lighting on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.

We extend to manufacturers of electrical apparatus an invitation to send to this office any and all facts concerning their business which will be of interest to the public. We make no charge for publishing news.

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The Electric Light Convention, which is in session in Baltimore this week, is the most important electrical gathering ever held in the United States. That this organization should so rapidly grow in strength and influence—the Association is not yet one year old—is an indication of the wonderful progress being made in the electric-lighting world, and shows the talent and capacity and financial ability that are rapidly gathering under this new and advancing banner. The proceedings up to the time of our going to press—Wednesday afternoon—were full of interest, which bids fair to not only continue, but greatly increase throughout the Convention. The Convention is largely composed of strong, earnest men, and the result of their discussions and deliberations cannot fail to be of great value to all interested in electric lighting or in any of the branches of electrical science.

In one respect the Pan-Electric telephone is superior to the Bell. The talk over the former can be heard all over the country.

The electric light company that failed to be represented at the National Convention this week, missed a splendid opportunity for receiving much practical and valuable information.

The history of the Pan-Electric Telephone Company and its methods is given considerable space in our columns in this issue. To members of the telephonic fraternity, these developments make "mighty interesting reading."

The third electrical exhibition at St. Petersburgh, which was opened on Jan. 1, is attracting much attention among the people, especially that portion devoted to the telephone. The exhibition is said to be noteworthy for the novelty, variety, and number of its objects. For illumination, all the known systems of electrical lighting are employed.

The Jarvis Engineering Company, of Boston, has issued a new catalogue showing their system of erecting steam plants for electric lighting. There are a number of interesting illustrations in the pamphlet, showing the arrangement of the steam plants in several of the New England electric-light stations, in all of which the boilers are set with the Jarvis furnace.

There will be a complete, detailed account of the National Electric Light Convention, with names of all attendants, in our next edition. The demand for copies of the REVIEW containing the report of the last convention, was so great that our large extra edition was exhausted before all were supplied, and we request all who desire extra copies on this occasion to send in their orders at once.

Solicitor-General Goode will have able counsel in his telephone suit. He has secured the assistance of A. G. Thurman, Grosvenor P. Lowry, of New York; Effa Hunton, Jeff Chandler, and C. S. Whitman, of Washington. The suit will be filed as soon as the Solicitor-General shall have had an opportunity to consult with his assistants in regard to the bill which is now in course of preparation at the Department of Justice. The place where the suit shall be instituted will not be decided upon until all the papers in the case are ready. The Pan-Electric people prefer that the suit shall be instituted at Memphis, St. Louis, Kansas City, or Cleveland, Ohio, in the order named.

The most complete telephone switch boards ever manufactured are now being set up by the American Telegraph and Telephone Company for use on their long lines between this city and Philadelphia. In these boards apparently every possible contingency that could effect the long-line service has been provided for, the testing board, with galvanometer, telephone and Morse signal attachments being entirely new in design and with which lines may be changed, tested, and the defect located, and yet the conversation be uninterrupted. The annunciator, which is replaced by the action of the operator in answering the call, presents a new feature in telephone signaling apparatus, and the intelligent arrangements for overcoming the difficulties to be met with in connecting the metallic circuits and grounded lines are none the less creditable to the skill of the inventor and the work of the manufacturers—the Western Electric Company. These boards have been constructed under the superintending skill of Mr. T. B. Doolittle, of the American Company, to whose inventive mind and thorough electrical knowledge is to be attributed their complete equipment for the work of long-distance telephoning. A special desk is provided to go with each telephone set for those subscribers in Philadelphia and New York who lease telephonic service between these cities. The boards will be set up and the lines be in working order within the next thirty days.

ELECTRICITY ON LAND AND SEA.

A scientist has discovered the presence of water in alcohol.—*Portland Argus.* Well! don't tell St. John, because he and his friends will go back again to milk, which will be an imposition on the already overworked cow.—*Burlington Hawkeye.*

As a matter of fact alcohol is found everywhere in nature, and while nature has not been quite so prodigal with electricity, man is hard at work to make it as universal in the arts as alcohol is in nature. Indeed so extensively is electricity entering into the every-day concerns of life that one cannot take up his daily paper without finding that some new field has been found for its application. In commerce and agriculture and the mechanic arts electricity is to-day a prime factor, and within recent years it has done much to revolutionize the science of war. The writer, who is in a position to see the plans and descriptions of all the novel warlike mechanisms as they appear, can bear witness that the majority of them are more or less dependent, either wholly or in part, upon electricity. There is reason to believe that the battles of the future, both on the sea and on the land, will require quite as much electrical skill as generalship.

Let us review some of the new electrical devices having to do with the art of war. There is the electrical rifle which makes the magazine gun of certain value. Heretofore the magazine gun was only of doubtful value, because a column of cartridges pressing the one upon the percussion or firing end of the other rendered a premature explosion imminent, and many soldiers and sportsmen have been injured by handling them too roughly. But, now, with a small electrical battery placed in the stock of the gun, percussion is an unnecessary adjunct to the metal cartridge and it is feasible to arm men with magazine guns. Next, we have the new electrical balloon recently invented by General Thayer, U. S. A. This balloon has created no little interest both here and abroad because of its apparent value in war. There are two forms, but both are electrical. In the first it is intended for use in an open country, where there are no railroads, for the purpose of quickly transporting men and material over a rough country. Cross-pieces are affixed to trees which have been cut down about fifteen or twenty feet from the ground, or to standards where there are no trees. Two wire cables, charged with electricity from a dynamo, are run over these cross-pieces. The balloon is held down by suspenders with wheels that run on the under side of the cables, and thus it may be transported across hills and narrow streams and broad valleys. The next form of this balloon is an air-ship which sails among the clouds unrestrained, the propelling power being compressed air and electricity.

Next, we have the very important captive signal balloon with incandescent light attachment. In the old days a great balloon, buoyant enough to support a man's weight, had to be taken into the field. It required great care and attention, and was always getting out of order. On the other hand the new balloon can be carried in a single knapsack and every small detachment can carry one with it. On the seas, the big guns are now fired by electricity. Ships can be and are lighted by electricity. Four different systems of electrical torpedoes and torpedo boats have recently been invented. One of the former, invented by Col. Bedan, makes torpedo netting about a ship worse than no defence, for it aids a torpedo, guided by electricity, to get at the hull. A new electrical torpedo boat, operated by electricity, swims under the surface of the water for miles and, by means of an electric light, goes under the hull of a ship and enables the crew to affix a torpedo.

A special telegram to the REVIEW from the Chemical Electric Light and Power Company, Boston, concerning their battery solution used in furnishing incandescent light for one of the elevators at 95 Milk street, is as follows: "We shall put lamp in other elevator, and sixteen-candle lamps in engine room. We have accomplished two hundred and ninety hours on one Volta-Pavia solution."

GENERAL WESTERN NEWS.

Just at present there is nothing of an electrical nature which is so interesting to the community at large as the telephone controversy, and, as Chicago is a sort of vortex in one of the world's maelstroms, more or less telephone stock of various kinds has been placed here. One or two of the original Doctor Jacobs are citizens of Chicago, and when these and other considerations are bunched, it is not to be wondered at that we should be treated to telephone matters three times a day, and between meals.

Our daily papers have had much to say on the subject of Bell and his opponents, and one of these has been from the commencement especially hard on the "monopoly," and proportionally strong in its commendations of the opposition. Sensational headlines are fitted to articles which, when boiled down to naked facts, are barren of anything but surmises, in which the wish is father to the thought. "It's Last Bluff," "The Monopoly Squeals," etc., are specimens.

One of our dailies, after publishing a large amount of matter in the interest of the opposition, one morning not long since astonished its readers with very copious extracts from the New York papers on the telephone scandal, and it really looked as if somebody had been to see somebody. But the paper assumed its old role in the next issue, and stated that, "actuated solely by a spirit of fair play, and the wish to give both sides a fair hearing, the *Tribune* yesterday printed a number of extracts from New York papers reflecting upon the methods of certain officials in Washington who have taken stock in the Pan-Electric Telephone Company. It should not, however, be understood that this journal sympathizes entirely with the views expressed in those extracts. * * * The Bell Telephone attorneys do not contribute to the editorial or any other department of the Chicago *Tribune*. Nor do the attorneys of any other telephone interest."

The apparently diametrically opposite positions assumed on two consecutive days was not less marked than that of a base ball nine in two phases of a game, and brings up to memory a story of newspaper life in Kentucky.

Shortly after the war the Bourbon element of Kentucky, unable to subsist on the political pabulum furnished by more moderate democracy, conceived the idea of an organ. The outcome of this enthusiasm was a morning paper with a staff of eleven editors, all warranted true blue "secesh" in principle. Among these there was a fair sprinkling of shoulder straps, and the individuals of the entire command were well enough acquainted with the customs of the State to hold their own when a bottle was to be pulled. The paper had a chief editor who lorded it over the other ten. One night in the division of labor two of the writers were allotted the same theme, and each wrote an editorial—but viewed the matter from quite different standpoints. "Ah! gentlemen, these articles—*hic*—don't consist. We—*hic*—will make 'em consist—*his*," said the chief. "My shears.' The whole of both articles appeared in the next issue, each alternate paragraph sandwiched in between two of the other writers'. The article consisted.

The *Tribune* also takes the cudgel in hand to club the local company here, and comparing it to the little one-horse street cars with a pen round the driver and a locked front door, where the passenger is expected to put his fare in a box, over which the legend stares at him: "Fare, five cents—put the money in here." The Chicago system is not the multiple switch board system—but another, in which a certain number of lines are given to each division of the board. Now, if a number on that section is called by another number on that section, the answer is made at once; but if the second party is not on that section the operator rings up the section or office in which it is, and the number wanted is demanded anew by the second operator. By the time this has been repeated two or three times it becomes monotonous. This is especially so when the operator

after cutting in finishes up a conversation with somebody about a diamond chemise stud, before answering—a case of personal experience a few days since. The following from the *Tribune* shows how it feels about the local service :

"The injustice of the telephone service is that subscribers do not get what they pay for. They help to run the telephone on the co-operative plan with this important distinction—that while they do a large share of the work they do not get any of the dividends."

The *Tribune* man will get himself disliked, if he isn't careful.

On the principle that it never rains but it pours, "more bother for Bell" is announced from Canada. A. A. Dickson, manufacturer of electrical apparatus, has filed an application with the minister of agriculture to test the validity of the Blake transmitter patent. The petitioner claims that the law has been violated in that the owners of the patent did not manufacture the patented instrument within the dominion, as required by law, within the time required. Mr. Dickson has been manufacturing Blake transmitters, and a dispute as to his right to do this has culminated in the above legal move.

The Globe Telephone Company's representatives here claim that in addition to the suit to test the validity of the Bell patent, their organization being owners of the Meucci patent, will institute an interference case.

A war of rates has broken out in Indiana. The United Lines Telegraph Company has crossed swords with the Western Union, the former company at competing points dropping the rate from 25 and two on a ten word basis to 25 for twenty words and one cent additional.

Judges Pardee and Billings, of the U. S. Circuit Court, are sitting at New Orleans, *en banc*, in the case of the Commercial Bell Telephone Company against the National Improved Telephone Company, asking injunction against infringement on the part of the defendants. The traditional defence is made, and Philip Reis (poor man, how much he has to bear) is accused of being the original inventor, while the "United Metropolitan Improved Hot Muffin and Crumpet Baking and Punctual Delivery Company," or the National Improved Telephone Company, whichever, claims that Bell obtained his caveat by fraud, and—here's where the funny business comes in—and that the Government having called in question the validity of the Bell patents, the court should not entertain a motion for a perpetual injunction against the use of their devices for telephoning, which are questioned only by Bell, who is himself to be very soon called upon to disprove allegations of fraud and deception made in the suit to be brought against him by the Government.

A occupies a farm, but B has sued him for the property. C wants the privilege of helping himself to a few of the back lots of the farm to cultivate for his own profit, because B has *claimed* that A obtained the farm through fraud.

Two Central Electric-Light plants have just been put in operation, one in the north division, covering both sides of Clark street, from the river to Elm street, the other upon the south side, near Madison on Fifth avenue, with wires running as far North as Washington, and east and west on Madison. The latter plant is one of the Sperry order while the former is a Thomson-Houston.

A new hanger for outside lamps has just made its appearance here, which is quite favorably received by not only the public, but by the electric-light people as well.

Its simplicity is one of its chief points of excellence. The hanger consists of two rods of any convenient form, the upper one of which is made fast to the building. The second rod is hinged to the upper at a point near the building where the upper rod is attached. At the outer end of the upper rod is a pulley through which the cord for raising and lowering the lower rod runs, and on this upper rod near the outer end is a catch, which, when the lower rod is raised latches on to a lug on the lower rod.

A second cord attached to this catch, when pulled, releases the fastening, and allows the lower rod, to which the lamp is attached, to be let down, and inward toward the building.

The wires are carried along the lower rod on insulators to a point over the lamp, and drop perpendicularly to it.

The advantages of this form of hanger are apparent at a glance. The ungainly loop, which in addition to its objectionable appearance, is always getting electric light people into trouble by grounding the line, is dispensed with ; the rope is relieved of the weight of the lamp ; the rope cannot break and let the lamp drop. The lamp when lowered for trimming is at the inside of the sidewalk, out of the way of pedestrians. The connections being all permanent, less wire is required, and we all know that the less outside wire there is on an electric-light plant the less cause for trouble we have.

Patent has been applied for by the inventor, Mr. C. C. Haskins, and it is the intention to furnish only the essential parts of the hanger, and permit those who purchase, to attach these to such rods as they may select.

S. G. Lynch, 144 La Salle street, gives the following as telephone stock values :

Chicago	$375 @	$406
Central Union	50 @	52
Michigan	65 @	67
Iowa Union	15 @	18
Great Southern	25 @	30
Colorado	18 @	20
Rocky Mountain Bell	40 @	45
Mo. & Kas.	52 @	54
United	15 @	17
Cumberland	70 @	75
Wisconsin	110 @	112
Bell, of Missouri	152 @	155

CHICAGO, Feb. 8, 1886.

BOSTON ELECTRICAL NEWS.

The Waltham Board of Trade have been investigating the subject of electric lighting with a view of organizing a company for that city. The particular system to be used has not been decided upon and the projectors of the company are now busy examining the rival systems.

S. W. Fuler and Holtzer, 22 Milk street, expect, in a few weeks, to move their business to more commodious quarters at 25 Arch street.

The Judkins Train Signal Company, 54 Devonshire street, are full of orders for their system. The western division of the Boston and Maine is fully and the eastern division nearly equipped. The changes necessary for this system are partially completed in the cars of the Main Central, and a general order has been issued by the manager of this road to the employes in regard to the working of the system. The Massachusetts Central has been equipped, and the Boston and Lowell will soon have their cars all provided with this form of signal. So certain is the signal of operation that the bell-rope is entirely discarded in some cases. By simply pushing a button a gong is rung in the engineer's cab in an instant. The bell-rope, especially on long trains, is not reliable, and often, although the rope may be pulled, the bell on the engine may fail to sound. No matter how severe the weather may be, the electric signal never fails to work. The apparatus furnished by this company for the Milwaukee and Northern railroad have not once failed to work through all the recent severe storms.

The Fitchburg Railroad station in Boston is at present lighted by electricity, An old stockholder remarked that this would never have been done while the road was under the management of John J. Swift and Wm. B. Stearns. The same stockholder relates an incident in the early history of the road, when a meeting was held at the old Exchange Coffee House to discuss the feasibility of completing the road to Fitchburg. The room was lighted by three small oil lamps. Alvah Crocker, of Fitchburg, had listened quietly to the plea of want of funds, when he suddenly jumped from his seat and exclaimed : "If this corporation is so almighty poor as you say it is, I move you blow out one of those lights ; two will be enough."

The Brush Electric Light Company, of Boston, held their regular meeting for the election of officers for the ensuing year : Hon. Hugh O'Brien was re-elected treasurer and manager, and S. S. Sias, secretary ; and the board of directors of last year were also re-elected. The report of the condition and prospects of the company was very satisfactory. Business is on the increase, and now that their entire plant is centered at the new station on Ferdinand street, the working expenses are much less than before. By next season, it is expected that a 1,000-arc light will be run from this station. The company intend at an early date to run large numbers of incandescent lights from this station.

Manager Patrick of the St. John's Brush Electric Light Company, was in the city last week. His company are supplying very successfully incandescent lights from storage batteries and will probably also furnish incandescent lights from machines direct.

At the Rogers Building, 205-211 Washington street, four 150 candle-power "Mammoth" incandescent lamps are to be placed in the corridors. Two lamps will take the current of one arc light, and will be in circuit with Brush arc lights. An automatic switch throws a second lamp in circuit when the first gives out.

The Consolidated Electric Company, of New York, by their New England agent, P. H. Alexander, have installed a 150-light 16 candle-power plant in the silk factory, of Belding Bros., Northampton, Mass. The plant later in the season will be increased to 750 lights.

At Portland, Me., there are thirty men at work, in four gangs, under the supervision of Mr. Farnham, electrician of the New England Telephone Company, repairing the damage done to the telephone lines by the last storm. At Portmouth, N. H., and Worcester, Newburyport, Mass., the wires are now all in working order. The severity of the storm is shown by the fact that in some places the wires were two inches thick with ice.

Everything in telephonic circles is quiet. There is some interest in regard to the place where Secretary Lamar will bring suit against the Bell Telephone Company. The court of the District of Columbia, where the Star Route cases were tried, is a somewhat questionable tribunal, for either party to the suit would, if beaten, appeal to the Supreme Court. Inasmuch as a large number of the members of the Supreme Bench have individually given opinions sustaining the Bell patents, no uneasiness is felt concerning the decisions of the Supreme Court as a whole.

The Thomson-Houston Company have orders for the following plants : Worcester, Ohio. 30 lights ; Waterbury, Conn., 30 lights (increase) for the Connecticut District Telegraph and Electric Company ; La Fayette, Ind., Gas Light Company, 30 lights; Sheldons & Sons, Marble Workers, Rutland, Vt., 45 lights ; Northampton, Mass., 30 lights ; Aqueduct, New York, 30 lights, increase, making the eleventh machine installed there ; Wilmington, N. C., 25 lights ; Durham, N. C., 50 lights ; Woonsocket, R. I., 38 lights, increase.

The Boston Post-office saved $10,000 last year by the use of the incandescent light, over gas.

The Chase Mill, Fall River, Mass., paid last year $1,051 for gas. The treasurer of the mill is treasurer of the Gas Company. This mill has 40,000 spindles.

The Flint mill, of the same place, expended only $400 for incandescent light, though they have 50,000 spindles.

BOSTON, Mass., Feb. 10, 1886.

National Electric Light Association.

(*Continued from page* 1.)

in our next edition. At the conclusion of roll-call, Hon. J. F. Morrison, the president, introduced Mayor James Hodges, of Baltimore, who delivered a hearty and eloquent address of welcome. The report of the Executive Committee was then read, and adopted, and also the reports of the secretary and treasurer.

A resolution was passed, deploring the loss to the association of one of its brightest members, Mr. A. J. Holt, of Cleveland, Ohio, who was connected with the Brush company of that city at the time of his death.

The convention will elect officers for the ensuing year on Thursday.

THE PROGRAMME OF THE CONVENTION.

The following is the programme of the Convention as adopted at the first session, and, as will be seen, covers a wide range of discussion, yet all of the topics being of much interest to the electric lighting fraternity.

Report of the Executive Committee on Credentials.

Naming of those who are entitled to seats in the Convention, giving separate lists of the active and associate members.

1st paper. "History and Progress of Electric Lighting," by Geo. Worthington, of New York.

2d paper. "Electricity as an Illuminant," Geo. S. Bowen, of Elgin, Ill.

3d paper. "Arc Lighting," by Wm. Hochhausen, of New York.

4th paper. "Incandescent Lighting," by Dr. O. Moses, of New York.

5th paper. "Storage Batteries," by Prof. Geo. Benjamin, of New York.

6th paper. "Use of Electricity in Lighthouses," Maj. Heap, Washington, D. C.

7th paper. "Best Equipment for Arc Lighting Stations," D. E. Evans, Baltimore.

8th paper. "Underground Wires," by Ralph W. Pope, of New York.

9th paper. "Steam Power," by F. Fosdick, of Fitchburg, Mass.

10th paper. "Operating Expenses," by E. R. Weeks, of Kansas City.

11th paper. "Relation of Electric Lighting to Insurance," by C. J. H. Woodbury, of Boston, Mass.

12th paper. "Proper Construction and Maintenance of Circuits," by E. R. Weeks, of Kansas City.

13th paper. "Carbons and Globes," by Frank Ridlon, of Boston, Mass.

14th paper. "History and Progress of Electricity, as applied to Motors," by W. J. Johnson, of New York.

15th. Report of Conference Committee on Uniformity of Prices for Apparatus in Service, by Frank Ridlon, of Boston, Mass.

16th. Annual Election of Officers.

17th Resolution fixing the place of the semi-annual meeting.

⁂ It is safe to assume that all the distinguished public men who were graciously favored with stock in the Pan-Electric Telephone Company, in exchange for influence, were grateful to the inventive genius, Rogers. Only one of the favored sons of men has left on record a transcript of his joyous feelings, when contemplating his bundle of beautiful but inexpensive pictorial shares. That man is Col. Dick Wintersmith, of Kentucky. His letter to Rogers is a model of English. It bespeaks the bubbling gratitude of an emotional nature. Every word seems to well up from a heart tingling with gratitude. If Rogers had never done anything to deserve well of his fellow-men, the fact that he gave the noble Dick Wintersmith a taste of supreme happiness, by endowing him with a few shares o embryotic stock, would entitle him to consideration. As for Col. Wintersmith's letter, it will live in our household prose when Rogers and his rattletraps, and his inductors and transmitters are forgotten.

Telephonic News

*** A sleet storm, in Portland last week, damaged the telephone exchange to the extent of nearly $1,000.

*** The models of the Reis transmitter and receiver have been examined at G. K. Milliken & Co.'s, 70 Washington street, and they are found to be exact representations of the original instruments. They are of the highest workmanship and highly finished. Numbers of schools and colleges are being supplied with these models.

*** It was the tender rays of Pan-Electricity that converted Col. Dick Wintersmith's winter of discontent into a glorious summer, composed exclusively of gooseberry bushes, bearing prospective greenbacks, and filled with singing birds, and the gallant Kentuckian did not hesitate to say so in his best holiday rhetoric.

*** When Col. Wintersmith, the efflorescent Kentuckian, received his little batch of Pan-Electric stock, he wrote to Rogers to say that his kindness was "incysted" in the recesses of his heart; but Gen. Johnston, in writing to Rogers, insisted that unless the enterprise succeeded, the public, under certain circumstances, might regard everybody concerned as swindlers

*** There are 5,500 sets of telephone instruments connected with the telephone exchanges in the city of New York, besides some 600 private-line instruments. It is estimated that 50,000 conversations take place over the wires of the metropolis every twenty-four hours. For each message there must be at least five "Hellos," which would make 250,000 "Hellos" going over the wires daily in New York.

*** Before Judge Don A. Pardee, in the United States Circuit Court, New Orleans, will be heard the application filed by the Bell Telephone Company for an injunction to issue against the National Telephone Company. The contest in this case embraces many highly interesting points, and has been the subject of considerable newspaper comment within the past two years. At present both telephone companies are operating in New Orleans, and the injunction applied for is to prevent the National Telephone Company from operating its lines, not only there but in other parts of the country. The National Government has taken steps to review the patent issued to the Bell Telephone people, and then the merits of the case will be tried before the courts. In view of these facts it is hardly believed that the court will touch upon the matter and issue the injunction until further steps have been taken in Washington by the Government.

*** In speaking of their new "pay-station" plan, General Superintendent Eckert, of the Metropolitan Co., of this city, says: "We intend as soon as possible, to establish all over the city a number of 'pay telephone stations,' where a person may go in and for a stipulated sum send a message all over the island. For instance, a person living in Harlem desires to send a message to a certain point down-town. There are private telephones in drug stores and elsewhere, but he is unacquainted with the proprietor or is timid about asking permission to use it. At the 'pay stations,' which we intend to establish, he can step in and for a fixed sum send his communication. It will be received, written out and sealed at the other office, up or down-town, as the case may be, and sent to the address indicated by messenger We mean business, and shall try the experiment at all events. In order to show where those 'pay stations' are, we shall print small cards which can be easily carried in the vest pocket, giving their location and the charges from one point to another. The scheme has been under consideration for some time, and we believe it will work." This plan has worked satisfactorily in a number of other cities, and certainly should in New York.

Here's a State of Things!

FULL INSIDE HISTORY OF THE PAN-ELECTRIC TELEPHONE SCHEME AS SHOWN BY THE LETTERS OF DR. ROGERS.

The letter-book of Dr. Rogers bids fair to become famous. The other day, upon the urgent request of the N. Y. *World* correspondent, he gave up the book, saying he had no concealment to make. The letters represent a great mass of miscellaneous papers. Last Friday a few selections were made from the doctor's voluminous correspondence. After several days given to careful sifting, the following have been found worthy of a place in the history of this Pan-Electric bubble.

The letters are interesting, because they show completely the personal intimacy between Dr. Rogers and the leading Federal officials and Senators who were booming this enterprise.

It must be remembered that Dr. Rogers is very explicit in his statements that he gave the stock as a gift to Garland, Harris, Johnston, Atkins and Young for the use of their names. The way the doctor is deferred to throughout the correspondence shows how this fact of his being the head of the original gift enterprise is appreciated.

It has been claimed by the Pan-Electric people outside of the Rogerses that there was never any effort made to sell the stock. The letters show constant struggles to sell rights and stock when in reality the company had nothing to sell.

The first letter of General Johnston's upon the subject of selling the stock is very significant:

"IF THE ENTERPRISE SHOULD NOT SUCCEED, ALL CONCERNED IN THEM WOULD BE CONSIDERED AS SWINDLERS."

WASHINGTON, Dec. 23, 1883.

Dr. J. W. Rogers.

DEAR SIR: Your note of the 21st was received yesterdey afternoon, and I saw Mr. J. Harris Rogers immediately in regard to its contents, as officially I can communicate with no one but him in regard to the stock which is borne on the company's records as *his*.

I reminded him that the sale of stock is not permitted by the company, and also that such sales, even if not prohibited, would be very dangerous. For, if the enterprise should not succeed, all concerned in them would be considered by the public as swindlers. I mean all concerned, all of *us*.

Most respectfully, yours truly,

J. E. JOHNSTON.

SENATOR HARRIS'S INTRODUCTION OF A CO-PARTNER.

UNITED STATES SENATE, WASHINGTON, D. C., Feb. 20, 1883.

Dr. J W. Rogers, or J. Harris Rogers:

Allow me to introduce to you Gen. Joseph E. Johnston. Please show to him and explain to him the inventions that you were kind enough to show me on Sunday evening, and oblige, respectfully,

ISHAM G. HARRIS.

"AN INTENSE INTEREST."

WASHINGTON, March 23, 1883.

J. Harris Rogers, Esq.

DEAR SIR: I beg you to let me know when you are ready to commence trials with the rented wire. I am looking forward to them with intense interest.

Very truly yours, J. E. JOHNSTON.

LOOKING UP FAVORABLE STATES.

MEMPHIS, TENN., March 25, 1883.

MY DEAR DOCTOR: I am in receipt of your letter of the 18th inst., which I found awaiting me on my arrival Friday night. I have examined the New Jersey statutes and do not find their provisions so favorable to us as you seem to conclude. Acting upon your suggestion, Senator Harris has prepared and sent to Nashville an amendment for our general laws of incorporation which will give us all the corporate rights and privileges which we desire. I am afraid, however, that the Legislature will adjourn before it can be passed. I find that the Maryland laws in respect to incorporations are extremely liberal, and I think we would encounter no difficulty in obtaining such a charter as we want in that State. Harry must necessarily be incurring some expense, and I would suggest that he draw upon the other members of the company for their *pro rata* share of it; it is better to keep the financial part of the business closed up as we go along. He might draw for the amount each one is to pay in installments of, say, $25 or $50 at a time. In notifying the members of this matter, he and Gen. Johnston can use my name if necessary. I am going to Arkansas in a short time, and you had better look up your land titles in that State and send them on to me.

Your friend, CASEY YOUNG.

RELATING TO THE "HERALD'S" FINANCIAL COLUMN.

WASHINGTON, April 14, 1883.

J. Harris Rogers, Esq.

DEAR SIR: I have just received your letter of the 17th, with your father's, to the Executive Committee, but none from Mr. Young.

I have examined the financial columns of the *Herald* without finding the name of the "American Postal Telegraph Company," so cannot judge of the value of the offer. Is the "embossed system" that in which the cylinder with tinfoil is used? If so, I estimate it above all the rest. But can have no opinion in regard to the offer until informed of the value of the stock to be paid in. Please find it in "report of stock sales," and inform me.

Very truly yours, J. E. JOHNSTON.

Mr. Young thinks that the use of your telephone may be sold in Tennessee and neighboring States.

SEEKING TO GET A BELL AGENT FOR A CLIENT.

UNITED STATES SENATE, WASHINGTON, D. C., Feb. 18, 1884.

J. Harris Rogers, Esq., or Dr. J. W. Rogers:

Allow me to introduce to you Capt. John N. Baffenger, of St. Louis, Mo. Capt. B. wishes to experiment with our telephone, and probably contract with us for its use in certain territory.

Please show him all he wishes to see, and oblige, ISHAM G. HARRIS.

SEEKING A CUSTOMER.

1023 CONNECTICUT AVENUE, WASHINGTON, D. C, Feb. 23, 1884.

J. Harris Rogers, Esq.

DEAR SIR: I have just received your letter of yesterday addressed to the Pan-Electric Telephone Company within, but to me without.

I think that you are mistaken as to the terms of contract with Myers and Harlan. But my object in writing now is to say that Mr. Garrett desires to "investigate" our telephone, with a view to purchase if satisfied with it. For that reason I hope that you will be able to return very soon, that we may not leave him time to change his mind.

Please telegraph me where to expect you. Or can your brother James give me the patent to show to Mr. Garrett?

Yours very truly, J. E. JOHNSTON.

SENATOR HARRIS WOULD LIKE TO SEE COL. LOONEY, AND IS SURE GOV. BROWN WILL BE OF SERVICE.

ABILENE, TEX., Sept. 6, 1883.

Dr. J. W. Rogers.

MY DEAR SIR: In answer to yours, I have to say that I am greatly gratified at the flattering prospects of the Pan-Electric, and, while I would like to see Col. Looney interested, and think he would be of value to us, I would not be willing to give him the tenth interest, nor more than $60,000 of it, or thereabouts.

After consulting with you, Gen. Johnston, Harry Atkins and Young, I offered Gov. John C. Brown an interest of $50,000. He thinks he can be of service to us and will do his best, and I have no doubt that he can be of very great service to us.

I sent him a note to you to-day, and he will be in Washington about the 15th inst.

I am and have been very busy here, but will leave for Memphis about 20th inst.

My kind regards to Harry.

Your friend, ISHAM G. HARRIS.

SENATOR GARLAND AGREES WITH ME.

WASHINGTON, Nov. 8, 1883.

Dr. J. W. Rogers.

DEAR SIR: Your note of this morning and inclosures were duly received.

I submitted Col. Looney's letter, with Mr. Young's indorsement, to Senator Garland, who agrees with me in the opinion that the proposition explained cannot be acted on until our meeting on (about) the 23d. I have telegraphed this to Col. Looney.

The account will be attended to without delay.

Yours truly, J. E. JOHNSTON.

NOT WILLING TO BREAK LOCKS EVEN TO MAKE A SALE.

WASHINGTON, 10.15 P. M., March 26, 1884.

Dr. J. W. Rogers and J. Harris Rogers, Esq.

DEAR SIRS: On receiving your first dispatch (at 6.15), I sent it to Senator Harris, who keeps our contracts. He replied immediately that he would comply with your request.

Your second despatch came about three and a half hours after the first. I carried it to the Senator's lodgings, and, he being absent, left the despatch with a note telling him that I cannot break Col. Young's locks. This I telegraphed to you at once. I regret this very much, for I will do anything for your advantage that does not seem to me wrong.

I do not see, however, how those who insist on the impress of the seal of the party of the first part can be satisfied with its impression by the other party. I do hope that when they see the missing sheet supplied they will be willing to wait until a seal can be obtained without violence.

With best wishes, yours very truly,

J. E. JOHNSTON.

SEEKING TO MAKE AN ARRANGEMENT WITH THE BELL COMPANY.

UNITED STATES SENATE, WASHINGTON, Jan. 25, 1884

J. H. Rogers, Esq.

DEAR HARRY: I have a telegram from the Bell office in Boston, saying that Mr. Vail was absent to-day, but would answer me to-morrow, and I have answered saying that we will be there on Monday morning. Hence I go on to New York to-night, and will leave there for Boston Sunday, and shall expect to meet you at the Parker House on Monday morning. His former letters have assured me that he would be pleased to see us at any time, if I would give him a day's notice.

Therefore I have given the notice, and as we have no time to lose, I am certain that it best to go at once.

Your friend,

ISHAM G. HARRIS.

SENATOR HARRIS HARD UP, BUT POLITE.

UNITED STATES SENATE, WASHINGTON, D. C., May 14, 1884.

Dr. J. W. Rogers.

MY DEAR SIR: Neither Harry or yourself have any occasion for mortification or explanation. I went to New York on the business of the company, and needed the aid of Harry. I had no other thought than that the company would pay expenses, and intended to advance them myself and see that the company paid them.

Hence, I have not expected either Harry or yourself to reimburse me. You owe me nothing on that or any other account.

Unfortunately my financial condition is such as to make it impossible for me to make the trade suggested by you.

I am compelled to raise $4,000 or $5,000 in the next few days to meet engagements already made. Respectfully,

ISHAM G. HARRIS.

LETTER FROM A NOTED KENTUCKY LAWYER EXPRESSING GRATITUDE FOR ROYAL FAVORS.

WASHINGTON, March 24, 1885.

MY VERY DEAR FRIEND: Your kind and characteristic letter was received several days ago. In answering it as I would wish to do I recognize at the threshold the poverty of the English language to in any way adequately express the unfathomable depths of gratitude I feel and the genuine and sincere

thanks that well up in my bosom and overflow the surroundings like a deluge. This may sound like hyperbolical language and gushing homonymy, yet every word of it is true, for in the very innermost recesses of my heart your kindness is incysted, and will nestle there as its chiefest gem until its latest pulsation will sound the knell of time. "Could I wreak my thoughts upon expression," the burning language necessary to be employed would light the vestal fires anew and glow forever there as the fixed stars in heaven shine, bright and beautiful and glowing as a golden burnished sheen. Your letter came to me like the grateful dew upon the parched and withered herbage, renewing its verdancy and rendering its dreariness beautiful. The expressed well-wishes and homage of one kind heart is worth living for, and makes one feel that life is not altogether vain. The experience of life has taught me that it is a boon of priceless value, for when genuine, as I know yours to be, it is a casket adorned all over with flowers, and is as rare in the casket of dear memories as the Koinour is among the family of gems. To say that I thank you with all my heart is but the most feeble portraiture of my feelings. Your letter struck me at a time when sorrow brooded over me like a funeral pall, when "hope withering fled and mercy sighed farewell." I felt truly sad and isolated, and my thoughts were gloomy and saturnine. Need I tell you, therefore, how timely and welcome your letter was to me, and how fruity and rich were its effects upon my soul, redolent of perfumed souvenirs and dear memories, awakening bright hopes and vaulting aspirations as fresh as the aurora of morn bespangled with its dewy diamonds. In conclusion may I express the wish and breathe the prayer that your life on this earth be so serene and happy and exempt from all its ills, that in its transition from this to a better world the change will scarcely be perceptible. I am as I ever hope to be your true and grateful friend,

R. C. WINTERSMITH.

Dr. J. W. Rogers, Washington, D. C.

THE STOCK BOOMING.

MEMPHIS. Aug. 16, 1884.

MY DEAR FRIEND: I have just arrived home, read your letters, and have seen Young. He had received your letter, which had upset him considerably. He denies emphatically that he ever said the Rogers telephone was worthless and he denies with emphasis that he has any interest whatever in the Harlan-Long attempted swindle; professes perfect loyalty and the deepest interest in the success of our telephone. It is booming in the West and here. Alabama is finished up and the money will be forwarded next week. I saw Boyle in Chicago Wednesday last. He expected to close Illinois, Iowa, Michigan and Kansas within ten days. He went to Detroit Wednesday night He has strong connections with most every State. I believe Young means to be true and stand with us against Long and Harlan. I hope Gov. Harris will take hold of the matter, and this fall Harry and Gen. Johnston with him will in some way get rid of Harlan if he does not come to terms. We are on high ground now and should have perfect harmony. I think for all the future we will have Casey's hearty co-operation. He is so situated that he can do nothing else. Should he fail to do this he would incur the displeasure of Gov. Harris, Gen. Johnston, Garland, Atkins, Brown. He is talking for us big now, here. I will spread myself next week on the stock and the market is splendid. My son will hand you this. I want him to see Harry and all of your family. He is a chip of the old block and is the friend of the Rogers family. Trade for that house for me quick and I will be with you. Everything is moving here splendidly. Give my love to Harry. Tell him he must come to Memphis. The Alabama telephones are the best ever made. You call talk 100 feet from them and fire clear every "pop." They go to Mississippi next week and Louisiana. Boyle tested with the Bell telephone in Minnesota 150 miles. None of them could talk ninety miles; failed completely except the Rogers telephone, which talked as well the 150 miles as it did 150 yards. Boyle says he can whisper through it across the continent.

Very truly, your friend,

R. F. LOONEY.

GEN. JOHNSTON ASSERTS HIS AUTHORITY.

WASHINGTON, March 29, 1883.

J. Harris Rogers, Esq.

DEAR SIR: I have just received a letter from your father, the terms of which make me think that he and (perhaps) you have not observed the fifth paragraph of the terms of our association, which makes it necessary that I should at least *witness* the experiments to be made over the rented wire.

It is expedient, of course, that one of us should be at each end of the wire during its use. In that respect we are properly placed now.

Very truly yours, J. E. JOHNSTON.

You will see in the eighth paragraph of the "terms" that I am a member of the Executive Committee.

CONCERNING CERTAIN SMALL REMITTANCES.

1023 CONNECTICUT AVE,
WASHINGTON, Aug. 3, 1883.

J. Harris Rogers, Esq.

DEAR SIR: To my great disappointment I find nothing in regard to Philip Reis in the Encyclopædia Britannica nor in a voluminous biographical work. This, however, makes the article you lent me no less interesting. It will be returned by the bearer.

In asking you for a receipt for Gov. Harris' payment I forgot that I had given him one. I beg you, therefore, to interline on your receipt (herewith) after "Received of" my name and the word "for," to relieve me of responsibility to the Governor.

Very truly yours,

J. E. JOHNSTON.

I requested Messrs. Atkins and Garland to remit you $102.87, one-third, and Mr. Young to remit $97.87, one-third. I forgot to mention this when we were together.

INTIMATE RELATIONS OF ROGERS, HARRIS AND JOHNSTON.

MEMPHIS, Oct. 4, 1883.

Dr. J. W. Rogers.

MY DEAR SIR: I herewith inclose letter to Gen. Johnston. Not having his Washington address, I send it to you for the information of yourself and Harris and for prompt delivery to Gen. Johnston.

Respectfully, ISHAM G. HARRIS.

SENATOR HARRIS' UNPREJUDICED RECOMMENDATION OF THE PAN-ELECTRIC TELEPHONE.

UNITED STATES SENATE,
WASHINGTON, D C, Jan. 14, 1884.

Gen. J. W. Denver.

DEAR SIR: In answer to your note of this day I have to say that I have used the Pan-Electric telephone in my rooms for sometime, and think it vastly superior to any telephone that I have ever seen.

And upon a somewhat careful examination, my opinion is that it does not infringe the Bell or any other patent.

Respectfully. ISHAM G. HARRIS.

HURRY UP, SO THAT WE CAN BEGIN TO REALIZE.

WASHINGTON, D. C., Feb. 18, 1884.

J. Harris Rogers, Esq.

DEAR SIR: Your note dated "6th (16th?) is just received. I am very sorry that the Rubber Company is so slow, for we may suffer in consequence. Our Washington contractors are already impatient, and those for Ohio, Illinois, etc., have already asked for instruments.

In reference to an "unanswered" letter of yours to me, I have received but one in the present month, and Gov. Harris undertook to answer that one orally, as he did next morning.

The proposal to pool our stock was duly received and generally agreed to. So you have no cause for anxiety on that subject. Do urge the workmen.

Yours very truly, J. E. JOHNSTON.

A CHECK FOR THE INVENTOR.

HOUSE OF REPRESENTATIVES,
WASHINGTON, D. C., Feb. 29, 1884.

J. Harris Rogers, Esq.

DEAR SIR: I have just received your telegram asking for remittance of $300, and inclose Col. Young's check on the Sergeant-at-Arms, House of Representatives, for that sum.

Hoping to see you very soon, especially as the question of conflict of patents may be, I am, very truly yours, J. E. JOHNSTON.

"THE PLACES WE CONTROL."

WASHINGTON, D. C., April 10, 1884.

J. Harris Rogers, Esq.

MY DEAR SIR: The meeting of which I advised you yesterday occurred last night, Messrs. Harris, Young and myself attending. We found, however, that no satisfactory settlement of accounts could be made without your personal assistance, and therefore agreed that I should request you to designate a place and time (outside of the sessions of Congress) at which it will be convenient to you to meet us to settle. We offer for the purpose the places we control, viz.: Senator Harris's committee-room, or quarters at No. 208 D street, Northwest, or Col. Young's quarters, No. 606 Thirteenth street, Northwest, or my house, No. 1023 Connecticut avenue.

Yours very truly, J. E JOHNSTON.

MR. YOUNG'S GOOD OPINION OF PAN-ELECTRIC STOCK.

Officers:

Joseph E. Johnston, President.
Isham G. Harris, Vice President.
Casey Young, Secretary and Treasurer.
A. H. Garland, Attorney.
J. Harris Rogers, Electrician.

OFFICE OF THE
PAN-ELECTRIC TELEPHONE COMPANY,
WASHINGTON, D. C, July 26, 1884.

DEAR DOCTOR: I inclose you, under direction your uncle, Dr. J. W. Rogers, two certificates of stock for fifty shares each—one in the Pan-Electric Telephone Company and one in the Pan-Electric Telegraph Company, which shares of stock have been put to your credit on the books of the respective companies.

I think the stock valuable and will within a reasonable period be worth in the neighborhood of par. I know all about the business affairs and financial condition of your uncle, and while the enterprises which he has been promoting will, I think, develop most valuable results, he has saved but little money, nearly all which he has realized have been used in making his instruments still more valuable, and in bringing his various enterprises before the public.

The Pan-Electric Association proper, embracing all of Harry Rogers' inventions, but no stock books have yet been prepared for that; when they are, you will have fifty shares issued to you.

Yours truly, CASEY YOUNG.

Dr. J. W. Rogers, Memphis, Tenn.

TO RESIST THE NATIONAL IMPROVED.

OFFICE OF THE
PAN-ELECTRIC TELEPHONE CO.
WASHINGTON, D. C., Oct. 18, 1884.

J. Harris Rogers, Esq.

MY DEAR SIR: You have no doubt observed the published statements of the "National Improved Telephone Company" in New Orleans—to the effect that our instrument infringes theirs and belongs to them—as a condition of your contract with them, gave all improvements and inventions you might subsequently make to that company.

Mr. Marble is preparing a statement for us at Gov. Harris' request He is clear on the point of infringement, but thinks that your assistance would be very valuable to him, and therefore begs you to come to his office Monday morning. Before Mr. Marble made this request I saw Mr. James and begged him to ask you to make an affidavit to be sent to New Orleans for publication in our defence. It would be conclusive.

With friendly regards to your father, I am yours, very truly, J. E. JOHNSTON.

.... Messrs. Brown & Brown, 106 Liberty street, New York, are introducing a novelty into the electrical trade, known as "zylonite" push-buttons. These buttons are unique and very handsome.

TELEGRAPHIC

.... Mr. Horace D. Thornberry, one of the able corps of train dispatchers for the Winona and St. Paul Railway, at Winona, Minn., has taken an unlimited vacation, going to Florida to recover his health. A host of friends regret the necessity of his absence, and he has their well wishes for his speedy recovery.

.... The telegraph poles in New York city are not exactly inimical to the government. If Bismarck succeeds in expelling the Poles from Prussia, perhaps he will assist us to dispose of our poles. As Commissioner Jacob Hess is a personal friend of the Chancellor, and is a sort of chance seller himself, perhaps he will act on the hint.—*N. Y. Ex.*

.... Justice Davis, of the Supreme Court of this State, has directed Edward S. Stokes, the Farmers' Loan and Trust Company and the United Lines Telegraph Company to give a bond in the sum of $200,000 to insure the payment to Millard R. Powers, as trustee of certain bondholders of the Bankers and Merchants' Telegraph Company, for whatever sum may be found due them, if hereafter it shall be determined that the receivers' certificates paid by Stokes at the time of the purchase of the Bankers and Merchants' property, shall be declared not to be a lien upon the property prior to the lien of the mortgage bonds, or show cause on the 10th inst. why the sale of the property of the Bankers and Merchants' should not be set aside. The order is made returnable before Judge Davis.

.... A reduction in telegraph rates is announced by the Postal and United lines, taking effect February 1st. Henceforth, instead of ten words, twenty words will be the basis of message rates, and the twenty will be sent for the same price as the ten in nearly all cases. The arrangement districts the wires. To all parts in New England and the Middle States, including Washington, the rate will be twenty-five cents for twenty words, and one cent for each word more. For all points within a radius of 300 miles from Buffalo the same rates. For all points beyond this as far as St. Louis, thirty-five cents for twenty words, and two cents per word extra. Beyond St. Louis, as far as Leavenworth and Kansas City, twenty words will be sent for the same as ten heretofore—fifty cents, and three cents per word extra. Other points beyond have the same proportionate reduction.

.... As President of and the person most lagely interested in the National Associated Press, Jas. A. Goodsell, made a contract with the Atlantic and Pacific Telegraph Company for the transmission and dissemination of news gathered by him and his agents. A few days after the contract went into operation the Atlantic and Pacific Company fell into the control of the Western Union Telegraph Company, which assumed all its obligations. The Western Union Company demanded higher rates of toll than were specified in the contract. Goodsell refused to pay them, and the service was discontinued. Goodsell soon afterward brought a suit for $22,000, which he claimed the Western Union Company had collected on his account, and for $650,000 as damages for breach of contract. The case was tried before ex-Judge James C. Spencer as Referee. He gave judgment for Goodsell, fixing on $16,000 as the sum collected by the Western Union for him and on $220,000 as the measure of his damages through the breaking up of his business. The Western Union Company appealed, and the General Term of the Superior Court ordered a new trial on the question of the damages for the breach of contract, holding that the referee had not fully considered all the contingencies growing out of the character of the business of the National Associated Press and the whims of customers likely to be affected by the chance to get better or cheaper news service than it offered. As to the claim of Mr. Goodsell for money collected by the Western Union, the General Term affirmed the judgment.

ELECTRICAL AND SCIENTIFIC

* * According to the annual report of the American Society of Civil Engineers, the total membership is 928.

* * It has been estimated that an iron car wheel will travel some 40,000 miles, while a steel tire will run the enormous distance of 200,000 miles before wearing out; thus, though costing so much more, steel has greatly the advantage.

* * St. Louis has a French hair-dresser who has filed a caveat and applied for a patent for an invention by which passengers and freight may be taken on and discharged from railway trains without stopping, and if it proves what its model would indicate it will be an important factor in the rapid-transit problem.

* * A telephone has been placed on board the steamer Monohauset plying to and from New Bedford, Mass. The wire is along the wharf at that place and connected with an instrument in the office. As the steamer leaves her wharf the wire is automatically detached. This is said to be the first telephone ever put into a steamboat in this country.

* * A plan for rendering paper as tough as wood has been recently introduced. It consists of mixing chloride of zinc with the pulp in the course of manufacture. It has been found that the greater the degree of concentration of the zinc solution, the greater would be the toughness of the paper. It can be used for making boxes, combs, for roofing, and even for making boots.

* * The Railroad Committee of the Council of St. Louis, at their meeting last Friday, discussed the elevated electric railroad bill. Messrs. Charles Hoyle, John W. Donaldson and Dr. Wellington Adams appeared in favor of the measure. They said they where in earnest, and intended to operate the road if they secured the charter. The further consideration of the scheme was postponed.

* * The decision of the House Committee on Expenditures in the Department of Justice that it has no authority under the Hanback resolution to go beyond the simple question of the Government's expenditures in the telephone cases will lead to the ordering of another investigation. It is proposed by some members to go into the entire history of all the telephone cases, the Bell, Pan-Electric, and the rest, and ascertain how far officers of the Government, under the present and preceding Administrations, have been involved.

* * M. Semmola, a German investigator, has succeeded in producing musical tones from metal plates, by electrifying it intermittently from an induction machine. The plate is supported on an ebonite funnel, and is a millimeter in thickness. The terminals of the induction machine are connected to opposite sides of the plates by wires; and the path of the current is interrupted so that sparks strike across. The plate then begins to sound, and it continues to sound even if a Geissler tube or a lead wire is interposed in the break.

* * A new invention is reported to have been recently perfected by Dr. Auer in the chemical laboratory of the Vienna University. It is said to consist in rendering a cotton wick incombustible by impregnating it with a metallic liquid, so that when applied to a gas burner, instead of being consumed it glows with a radiance somewhat resembling that of the electric light. It is said to be adaptable to any form of burner, and should it fulfill the expectations which have been confidently expressed concerning it, may bring about a revolution in gas lighting. The more improvements are introduced into gas lighting the greater justification will there be for allowing freedom to the development of electric lighting. A fair field and no favor should be accorded to both.

A Lively Time Among the Stockholders of the New England Telephone Co.

Editors Electrical Review:

Telephonically speaking this place has been more than lively the present week. An informal meeting of the stockholders in the New England Telephone Company was held in one of the large halls on Thursday, at which about 100 stockholders were present, the occasion being to consider the advisability of accepting what the Bell Company term a concession to the New England Company. President Sherwin and Directors Parker, Ayer, and Glidden, were present to explain matters, and there was some very lively talk at times. The proceeding, as summed up by the Secretary of the meeting, was as follows:

The meeting was called to order at 3.15 P. M. by John J. Pickman, Esq., who was subsequently chosen chairman, with Chas. L. Knapp secretary of the meeting. The plan of proposed concession, as embraced in a circular addressed by Thomas Sherwin, president, to the stockholders, under date of January 15, 1886, was read, and followed by general discussion, and from which the following facts were established, to wit:

1. That it was understood by the Board of Directors of the New England Company that the proposed $1,000,000 of preferred stock, and mentioned in circular aforesaid, was to come from the present *unissued treasury stock.*

2. That when from time to time issue of any portion of this $1,000,000 of preferred stock should be made, 41 *per cent. of the amount so issued should be given free to the American Bell Telephone Company and added to their holding of franchise stock,* as per 1883 contract.

3 Upon the statement of President Sherwin it is written in the present contract (1883) between the American Bell Telephone Company and the New England Telephone and Telegraph Company, to the following effect: *That the New England Company shall continue to pay royalties to the American Bell Company after the expiration of its patents, for all time and forever.*

5. That the statement published in the Lowell *Morning Mail*, January 16th, and over the name of a New England director, wherein the writer stated he "believed that the balance of the treasury stock and the $231,000 belonging to the company as trustee stock will be canceled, thus reducing the capital to $10,670,200," was made under a misapprehension and is not a fact.

6. That the item known as "trustee stock" ($231,000) is a block of stock held by some person or persons (not stated in the meeting) as trustee, and for the purpose of sale for working capital *at a price less than par*, if the directors so elect, the "unissued treasury stock" being held under the restriction that it shall not be sold for less than par. The American Bell Company have on this trustee stock received its 41 per cent. as contract before mentioned.

As indicating the sense of the meeting the following was passed by voice vote:

Resolved, That we, the stockholders of the New England Telephone and Telegraph Company, assembled, do hereby, and at this time, express our dissatisfaction at the proposed plan of the concession as set forth in a circular from the president of this company to the stockholders under date of January 15, 1886, and that we being fully satisfied, after careful inquiry and explanation from the president and directors of the company, do recommend to our fellow stockholders to vote against its passage at the meeting to be held in New York City on Tuesday next.

A committee consisting of the chairman and secretary of the meeting was instructed to attend the meeting in New York City on Tuesday next, and present this action of the meeting, also to act upon proxies in accord with the above expression.

A committee consisting of Hons. J. N. Marshall, George A. Marden and Frederic T. Greenhalge were chosen, who should wait upon the American Bell Telephone Company directors and endeavor to secure from that company more favorable terms of life.

A committee consisting of the chairman and secretary of the meeting and Thomas R. Garity was chosen to prepare a plan for a permanent organization, and when prepared to call a meeting of stockholders and report.

The meeting adjourned shortly before 6 o'clock. There were in attendance more than one hundred stockholders of Lowell, Manchester, Worcester, Waltham, and elsewhere. CHAS. L. KNAPP, Sec'y.

Directors Parker and Ayer were about the only stockholders that favored the plan as presented. It is stated, on good authority, that at meetings of directors of the New England Company, when the matter was being discussed, Mr. Glidden voted in favor of the proposition as made, but at this meeting he voted against it and made the remarkable statement that, as former officers of th Bell Company had made profits out of the sale of the territory it was no more than right the Bell Company should make a concession. What this had to do with the matter is no clearer than why he should favor the proposition as a director of the New England Company, and then vote against it at the stockholders' meeting. It is said the committee appointed to wait on the Bell Company did their duty, but were unable to obtain anything more than already offered. It is probable that strong efforts will be made in the Legislature, now in session, to in some way reach the Bell Company.

The meeting of the New England stockholders in New York shows that a large majority of the stock was in favor of the concession. The great kickers from Lowell were only able to show a voting strength of about one in ten shares of the property stock. Some very warm discussion was indulged in, the kickers making up in loud talk what they lacked in votes. The Bell Company has little to fear from their implied threats.

LOWELL, Mass., Jan. 30.

The Electro-Magnet in Ophthalmic Surgery.

The following is extracted from the review of Hirschberg's book on this subject in the *Archives of Ophthalmology*, vol. xiv. p. 426. The instrument used by Hirchberg is a magnetic machine, with zinc-carbon elements in a glass jar holding one liter. He renews the fluid from time to time, and always tests the energy of the current before using it. There is no need of the enormous machines proposed by Voltolini Voltolini asserts that the click of the iron striking the magnet cannot be heard; but Hirschberg asserts that he has repeatedly heard it. Comparison of the magnetic extraction of iron from the lens with the old method shows that the former offers no special advantages over the latter, except that with the magnet the foreign body never falls into the vitreous. The removal of iron from the vitreous is the most important for magnetic extraction in ophthalmic surgery. The extraction may be made either through a meridional cut in the sclera or by a corneal section after extraction of the lens or after capsulotomy. A piece of iron is small for the vitreous chamber when it weighs from twenty-five to thirty milligrammes, and with such a piece of iron we may obtain perfect success, even at a late date. It is moderately large when it weighs fifty to one hundred and fifty milligrammes, and then only an early operation is likely to be successful. When it weighs from two hundred to five hundred milligrammes, the most prompt extraction cannot restore vision, and even the preservation of the eyeball is doubtful.

It is difficult to define the indications for operating If we see a patent in the first stage, with a small piece of iron in the vitreous, it is best to operate without delay. If a scleral section must be made, we must etherize the patient,—the pain in removing the foreign body is said to be excruciating,—and choose a spot rather downward and outward than downward and inward. If an equatorial section be made, there is danger of collapse and total destruction. In making the section, a Graefe knife is plunged through the sclera several millimeters deep into the vitreous, and the scleral incision is enlarged to about six millimeters in length. The magnet is then introduced and allowed to remain several seconds, and then withdrawn. The danger of sympathetic ophthalmia is slight after using the magnet.

Hirschberg adds: "If, in the long list of extractions of iron from the vitreous with the magnet which I have performed in the last five years, I have succeeded twice in obtaining excellent vision, once a remnant of vision, and twice in preserving the shape of the ball, the difference in favor of this method will be more marked when I say that in the first ten years of my practice I never succeeded a single time in saving a trace of sight when I attempted the removal of iron from the vitreous by purely mechanical means." Hirschberg also gives an instance of a minute piece of iron being removed from the lens by a magnetized cataract-knife; and, in cases of minute chips in the lens, the effect of magnetized instruments is to be tried before resorting to the magnetic battery

Telegraphers' Mutual Benefit Association.

The Insurance Examiner of New York has recently made a thorough examination of the condition of the Telegraphers' Mutual Benefit Association, and has reported to the Superintendent of Insurance as follows:

NEW YORK, Jan. 19th, 1886.

To the Hon. Robert A. Maxwell, Superintendent Insurance Department, Albany, N. Y.

SIR: Pursuant to instructions contained in appointment No. 489, the undersigned have made an examination of the condition and affairs of the Telegraphers' Mutual Benefit Association of New York, and respectfully submit the following:

"This association commenced business in 1867, and transacts life insurance business on the co-operative plan. Only those employed in the telegraphic business are eligible to membership. Its certificates provide for the payment of one thousand dollars to the beneficiaries of the assured, for which members are assessed at the uniform rate of one dollar for each assessment."

As some of the members desired a larger amount of insurance in the association, an additional class, known as the Second Division, was established in 1880, the members of which are entitled to the amount of one assessment of one dollar on each of the members of said division, not to exceed one thousand dollars. The number of members in the first division is 2,921, in which there were 29 deaths during the last fiscal year. In the Second Division there are 329 members, in which one death occurred during the last fiscal year. All losses are promptly paid, and the expenses of management are very small.

A reserve fund has been established in the first division amounting at present to $49,100 invested in the manner set forth in "exhibit A," annexed hereto, which is a statement showing the financial condition of the association on January 9th, 1886.

A copy of the Constitution and By-laws marked "Exhibit B" is also filed herewith. The affairs of the Association have been carefully, honestly and economically managed. Very respectfully,

MICHAEL SHANNON,
Chief Examiner.
JOHN A. HORAN.

EXHIBIT A.

Statement showing the Assets and Liabilities of the Telegraphers' Mutual Benefit Association of New York on January 9th, 1886.

ASSETS, FIRST DIVISION.

Cash deposited with Western Union Telegraph Co.	$4,068.81
Due from members on assessments heretofore levied	2,000.00
Total assets	$6,068.81

LIABILITIES.

Four death losses unpaid	$4,000.00
Surplus	2,068.81
Total as above	$6,068.81

RESERVE FUND.

$3,000.00 par value Western Union Telegraph Company 7 per cent. registered sinking fund due 1900 at 120	$3,600.00
$35,000 00 par value Gold and Stock 6 per cent. coupon bonds, due 1895, at par	35,000.00
Loan on bonds and mortgages	4,000.00
Cash deposited with West-Union Telegraph Co.	6,500.00
Total reserve fund assets	$49,100.00

SECOND DIVISION.

ASSETS.

Cash on hand	$83.48

LIABILITIES.

None

Two Notable Incandescent Plants of the U. S. Illuminating Company.

In the magnificent Mutual Life Building, corner of Nassau and Liberty streets, this city, the U. S. Illuminating Company have recently completed an incandescent plant that for intelligent handling of the question of disposition of power has never been excelled—in fact, is an original and valuable method that we never remember to have seen mentioned. The original plant of one large engine and three dynamos of 250 lights each, which has been running since March, 1885, not having capacity for the 1400 lamps in position in the building, it was decided to make an increase of the capacity of steam and electrical plant. There are two 60 H. P. Armington & Sims engines, belted direct to the four dynamos of 250 lights each, and yet with this 120 horse-power there is such a lack of vibration that the occupants of the banking house on the floor directly above have not yet discovered their proximity to the engines. The building proved, on examination, to be a very creditable "sounding-board," and President Lynch, of the Illuminating Company, discovered that he had to solve the problem of putting his engines there so that their operation could not be detected, and that he has succeeded a visit to the building will satisfy any one. And it was all a mere matter of engine foundation. A little felt did it. Then there was a solid and immense foundation in addition to the six inches of felt and some two feet of sand, the entire foundation being surrounded by a substantial wall, all entirely independent of the building. The floor of the engine-room itself is detached from the engines, leaving them firmly planted on their foundation, their motions so deadened by the felt and sand as to be scarcely perceptible even to one standing on the floor by their side. The objectionable feature of the operation of having engines in the building being removed, the other work was easy of satisfactory accomplishment, and the beautiful Weston lamp is making happy the occupants of this notable building, as only the work of the Weston dynamo and lamp can do.

Another plant just completed by the Illuminating Company is in the Post Building, back of the Custom House on Nassau street. There are 400 lights here, two dynamos and one 45 horse-power engine furnishing the source and power, the engine being set in its foundation on a plan similar to those in the Mutual Life Building. Mr. Eugene T. Lynch, Jr., whose work has been the designing of these plants, says he got the idea concerning the disposition of the engines from the method adopted in setting a telescope, by which all vibrations are prevented.

The Ball Unipolar Dyna mo.

The REVIEW made mention two years ago of the unipolar dynamo, invented by Mr. Charles E Ball, now of Reading, Pa. Since that time the introduction of the Ball system has proceeded slowly, until within the last few months, when this light, through the energy of General Agent H. M. French, has received a flattering patronage, and, besides, has scored an excellent record wherever it has been installed. The company is crowded with business, and an enlargement of its facilities of manufacture is now being arranged. The novelty of the Ball dynamo is that it has two armatures, each rotating within the inductive influence of only *one pole* of a field magnet, and hence its name—the Unipolar. It is constructed with less material than is usual in dynamos, has low internal resistance, and excellent results are secured with small power. The current is regular, and the light produced is steady, soft and uniform. On this page we illustrate the Ball dynamo and arc lamp.

Mr. H. W. Spang, a well-known citizen of Reading, Penn., is President of the Ball Company, and has recently arranged for greatly extending the business and factory facilities of the company.

—— Lamp Inspector Beck, of Jersey City, states in his annual report that there were 698 electric lights lighted during last year.

Underground Electric Light Wires in Detroit.

General Manager Hapgood, of the Thomson-Houston Electric Company, Detroit, in a recent interview, says: "We are putting in a plant of 135 arc lights, besides our incandescent lights, and are immediately going to erect a large steam plant of the most improved appliances and of about 400 horse power, capable of running 250 arc lights and 1,000 incandescent lights. I am a tenant of the Dorsett Conduit System, which has many advantages; as the conduit is impervious to water and free from gases there is nothing to destroy or damage the insulation, and the wires cannot fail to last a lifetime."

"How much wire have you in the conduit?"

"Two complete circuits of about one and one-half miles each."

"How do you pay for your privilege of using their conduit?"

"They charge rental of $500 per mile for each duct for one year."

"Can you put more than one wire in a duct?"

"We can put four complete circuits in a duct."

"How many ducts have you?"

"Two."

"That would cost you $1,500. Isn't that a very large rent, considering that with your wires on poles it would cost you nothing?"

"That is just where you are mistaken. I consider the rent of the conduit cheaper than the poles for nothing, if you think of the immense expense of maintaining the wires on poles. Always after a storm, and usually without a storm, you will find an army of men repairing the wires on the poles. This expense amounts to much more than the rent of the conduits, without considering the annoyance and loss sustained to individuals by having their lights and telephone out of order."

—— The United States Electric Light Company, of Elmira, N. Y., is managed by Mr. S. W. Hall, one of the aldermen of the city. This company should receive good treatment at the hands of the city fathers.

—— Macullar, Williams & Parker, Boston, intend to increase the 25-light Ball plant, which was installed in the latter part of October last, by the addition of another 30 light machine.

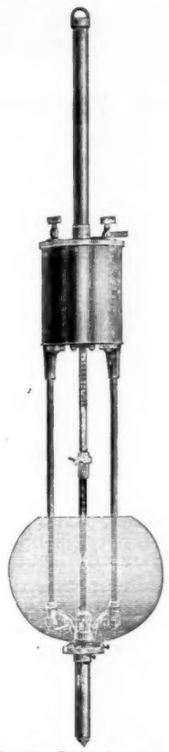


FIG. 2.—BALL ARC LAMP.

—— A dispatch from Akron, O., states that the bride-elect of Thomas A. Edison is Miss Mina Miller, second daughter of Hon. Lewis A. Miller, a wealthy manufacturer of that place, and president of the Chautauqua Assembly. The wedding is appointed for February 24.

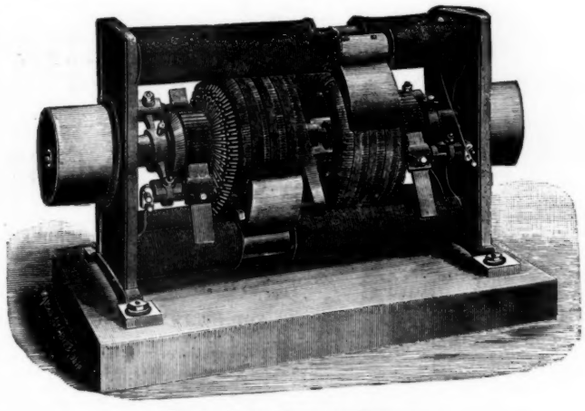


FIG. 1.—BALL UNIPOLAR DYNAMO.

Electric Lights Wanted in Lockport.

Editors Electrical Review:

The common Council of the city of Lockport has advertised for bids for lighting the entire city. First, with arc lights; second, with incandescent lights. I write you as the advertisement is only in local papers and may not reach the several electric-light companies. Yours, etc,

LAWRENCE J. MCPARLIN,
Supt. of Fire Alarm and City Wires.
Lockport, N. Y., Feb. 4th, 1886.

Discovered at Last.

First Kentucky Colonel—I see that a man in Pennsylvania has made a great discovery.

Second Kentucky Colonel—Ah, what is it?

"He thinks he can decompose water and produce an excellent illuminant."

"Is that so? Well, do you know I always expected that some use would finally be found for water?"

—— The storm in Portland last week did considerable damage to all the electrical companies. The *Press* says: "The city committee on electrical appliances held a meeting Saturday afternoon to take into account the state of things occasioned by the "ice embargo" on electric wires. In view of the fact that the Electric Light Company expressed their willingness and ability to light the city on Thursday night, and subsequently, but were not allowed to do so on account of the danger arising from telephone, fire-alarm and telegraph wires falling across the electric light wires, the committee resolved to offer an order at the meeting of the Board of Mayor and Aldermen this evening, requiring all companies and individuals using and maintaining wires for transmission of intelligence, light, heat or power, to attach to their wires some safety device or catch, in order to prevent fire resulting from said wires coming in contact with wires carrying high-tension currents. The committee will leave nothing undone to put all the electric appliances in the city in a perfectly safe condition, and to restore the lights at the earliest possible moment.

ELECTRIC LIGHT NEWS

—— The electric light now lights the palace of the King of Corea.

—— Oakland, California, is advertising for proposals for a police, patrol and fire-alarm signal service to be placed in that city.

—— There was a general absorption of electrical information in Baltimore this week. That city should be rich in electrical lore for several weeks to come.

—— Shepard, Norwell & Co., Boston, are putting in a new 60 horse-power Brown engine to run their 36-light Brush arc plant and their incandescent plant. The 150 16-C. P. light dynamo is to be replaced by a 200-light machine of the same type. The incandescent system used is the Bernstein.

—— A boy at Fostoria, Ohio, while carelessly playing with a wire connected with an electric light circuit, stuck one hand in a barrel of water and received such a shock that death resulted. The friends of gas will no doubt widely advertise this fact; yet had the boy been as careless in turning off gas in his bed-room, he would very likely died of suffocation.

—— *L'Electricien*, says that an amateur gravely asked, the other day, with what liquid the Gaulard-Gibbs secondary generators acted; and another gentlemen, whose knowledge of electrical science was somewhat exceeded by his ambition, was desirous of achieving immortal fame by coupling up a dynamo with an electrostatic induction machine in order that due advantage might be taken of the large quantity of the current furnished by the one, and the enormous tension of the other.

—— During the past week there has been organized the MarlboroSchuyler Electric Light Co., of Marlboro, Mass., who have bought the Marlboro Electric Light plant put in by the Schuyler Company some few weeks since, paying therefor the sum of $25,000. The company consists of the most prominent of the citizens of Marlboro, among them Mr. Lorren Arnold, president of the company; Mr. S. Herbert Howe, vice-president; Chas. Holyoke, secretary and treasurer of the company, with W. N. Davenport and Charles Stone as other directors. The company already contemplate increasing their plant, inasmuch as the town will discontinue the present system of gas and adopt the electric light for the entire town during the next fiscal year. Among other isolated plants which the Schuyler Company has started during the past month is the prominent one of the Gold Medal Braid Company for its factory in Attleboro Falls, Mass. The Schuyler Company figure that it costs but one per cent. per hour for its arc lights when run by manufacturers for their establishments where they already have power established for their own manufacturing purposes.

—— The Guernsey & Schudder Electric Light Company, of St. Louis, has filed an answer in the injunction proceeding commenced against it by the Western Union Telegraph Company, to restrain it from placing electric light wires above or near the wires of the Western Union on Locust street, between Third and Fourth streets. An injunction was granted enjoining the electric light company from placing its wires above those of the telegraph company. A motion to dissolve it is filed with the answer. The answer sets out the incorporation of the electric light company, and the ordinances of the city and rules and regulations of the Board of Public Improvements relative to telegraph, electric and telephone companies, all of which, it is alleged, the electric light company has complied with; that its wires are insulated by asbestos and fireproof material; that they cannot sway or touch any of the telegraph wires, and that it is altogether improbable that any of them will break, and if any of them should break and come in contact with the telegraph wires no harm would result, as the fracture would necessarily break the current of electricity.

ELECTRICAL PATENTS

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING FEB. 2, 1886.

335,102 Tower; John S. Adams, Detroit, Mich., assignor to Detroit Iron Tower Co., same place.

335,105 Armature for dynamo-electric machines; Herman R. Boissier, New York, N. Y.

335,158 Incandescent electric lamp; Elihu Thomson, New Britain, Conn., assignor to Thomson-Houston Electric Co., Boston, Mass.

335,159 System of electric distribution Elihu Thomson, New Britain, Conn., assignor to Thomson-Houston Electric Co., Boston, Mass.

335,160 Incandescent electric lamp; Elihu Thomson, New Britain, Conn., assignor to Thomson-Houston Electric Co., Boston, Mass.

335,269 Electrical switch; Chas. F. Brush, Cleveland, Ohio.

335,275 Printing telegraph; Richard N. Dyer, New York, N. Y., assignor to the Commercial Telegram Co., same place.

335,285 Device for transmitting power from electric motors; Edward H. Johnson, New York, N. Y.

335,294 Telephonic transmitter; James F. McLaughlin, Philadelphia, Pa.

335,321 Mechanical telephone diaphragm; Wm. Taylor, Niles, Mich.

335,325 and 335,326 Dynamo-electric machine or motor; Wm. L. Voelker, Morton, Pa., assignor to John H. Irwin, trustee, same place.

335,355 Dynamo-electric machine; Carl Hering, Philadelphia, Pa., assignor of one-half to Chas. H. Banes, same place.

335,364 Telephone transmitter; Albert K. Keller, Boston, and Edward H. Lyon, Chelsea, assignors to the American Bell Telephone Co., Boston, Mass.

335,368 Electric lamp; W. Goold Levison, Brooklyn, N. Y.

335,372 Electric fire-escape; Michaelis D. Marcus and Nathan H. Epsteyn, Portland, Oregon, assignors of one-fifth to Arthur M. Plato, same place.

335,436 Telephone circuit; Thos. B. Doolittle, Bridgeport, Conn.

335,459 Electric arc-lamp; Friedrich Klostermann, Vienna, Austia.

335,482 Printing telegraph; Arthur C. Robbins, Buffalo, assignor of one-half to Edward C. Cole, Albion and John D. Larkin Buffalo, N. Y.

335,499 Process of heating and reducing ores by electricity; Chas. S. Bradley, Yonkers, and Francis B. Crocker, New York, N. Y., assignors to Cowles Electric Smelting and Aluminum Company, Cleveland, Ohio.

335,501 and 335,502 Telephone transmitter; Wm. Burnley, North East, Pa., assignor of two thirds to Chas. A. Hitchcock, same place, and Lewis F. Watson, Warren, Pa.

335,510 and 335,511 Telephone transmitter; North Dowling, Philadelphia, Pa.

335,522 Telephony; James Houlehan, Toledo, Ohio, assignor of one-half to Wm. A. Bunton, Boston, Mass., and seven-sixteenths to J. S. Barker, and E. E. Dwight, Toledo, Ohio.

335,547 Electric motor; Elihu Thomson, Lynn, Mass.

335,548 Switch, or turn-off for electric circuits; Elihu Thomson, Lynn, Mass.

WHEN WRITING for Catalogues & ordering Articles advertised in our columns please mention that you saw the advertisment in the ELECTRICAL REVIEW.

REIS TELEPHONE.

Transmitter and Receiver $2.00 Each.

These electric telephones ante-date and do not infringe any telephone patent. Send stamps for circulars and pamphlets.

G. K. MILLIKEN & CO.,

70 Washington Street, Boston, Mass.

PROPOSALS

Are hereby invited and will be received until the 1st April proxo., for lighting the city of Asheville, North Carolina, with Electricity or Gas. Lighting area about one and one-half miles square; population 6,000.

GEO. W. SCOTT
N. W. GIRDWOOD, } Aldermen,
A. RANKIN,
Committee.

DETROIT ELECTRICAL WORKS,

MANUFACTURERS OF

ELECTRIC SUPPLIES,

INCLUDING

Medical Batteries, Skeleton and Box Bells, Burglar Alarms, House Annunciators, Fire Alarm Boxes, Pins and Brackets,

INSULATED MAGNET, TELEPHONE and ELECTRIC LIGHT WIRE.

GENERAL OFFICES AND FACTORY, Detroit, Mich.

EASTERN AGENCY, 33 Astor House Building, New York.

ELECTRIC LIGHT DECORATIONS

For Christmas Trees, Show Windows, &c.,

WITH

EDISON Lamps & Batteries.

Send 5c. stamp for Catalogue of

Electric Lamps, Instruments, &c.

THE STOUT-MEADOWCROFT CO.

Authorized Agents for Edison Lamp Co.,

21 Ann Street, New York.

OKONITE

TRADE MARK.

CHARLES A. CHEEVER, President. WILLARD L. CANDEE, Treasurer

THE OKONITE COMPANY.

MANUFACTURERS OF

Underground, Aerial and Submarine

INSULATED WIRES AND CABLES,

No. 13 PARK ROW, NEW YORK.

THE UNITED STATES ILLUMINATING CO.

59 AND 61 LIBERTY STREET, NEW YORK.

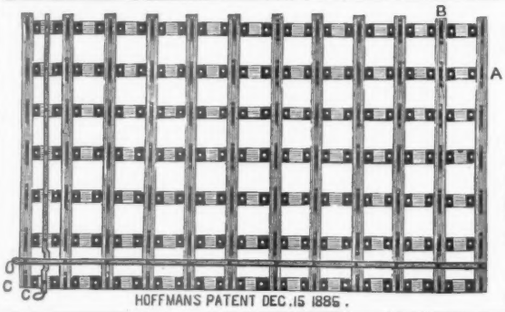
SOLE GRANTEES OF THE PATENTS OF WESTON, MAXIM, FARMER AND OTHERS FOR THE CITY OF NEW YORK AND VICINITY.

Five years' practical experience in the installation of these well-known systems of Arc and Incandescent Electric Lighting, enables the Company to give the most perfect, reliable and economical Electric Lighting known.

Among the most prominent installations which this Company has effected in the city and vicinity, are the following:

New York Post Office,
Washington Building,
Mortimer Building,
Union Ferry Co.,
Pennsylvania R. R. Ferry,
Mutual Life Insurance Co.,
Coleman House,
Hotel Dam,
St. Denis Hotel,
Bechtel's Brewery, Staten Island,
Brooklyn Eagle,
Opperman & Muller, Turtle Bay Brewery,
Equitable Building,
New York Ferry Co.,
Tribune Building,
Press Club,
Delmonico's,
Hotel Brunswick,
Lotus Club,
Union Club,
Union Square Hotel,
Brooklyn Bridge, and others

Estimates made by Experts at short notice, on application at the office of the Company.



HOFFMANS PATENT DEC. 15 1885.

THE ALARM ELECTRIC MAT.

DESCRIPTION.

The brass strips *A* cross the brass strips *B* and are insulated at the intersections. Connection is made at *C* with bell and battery. The slightest pressure completes the circuit.

Send for Price-List and Circular. Agts. wanted.

BROWN & BROWN,

106 & 108 Liberty St., N. Y.

GONDA (FORMERLY PRISM) CELL, COMPLETE.

Leclanché,

The Standard Open-Circuit Batteries of the World.

GONDA and DISQUE,

The Only Genuine Leclanché Batteries

Are those which bear this LABEL and the Trade-Mark, GONDA.

DO NOT BE IMPOSED UPON BY IMITATIONS.

If dealers have not the Genuine Battery, send direct to us for Price-List.

THE LECLANCHÉ BATTERY CO.,

149 West Eighteenth Street, New York.

GENUINE DISQUE CELL, COMPLETE.
The Porous Cell also bears Label.

Standard ✣ Electrical ✣ Works,

MANUFACTURERS OF

TELEGRAPH AND TELEPHONE APPARATUS,

Hotel and House Annunciators, Burglar Alarms,

CALL BELLS, "POST'S" MAGNETO BELLS,

PINS and BRACKETS, BATTERIES, &c., &c.

IN STOCK:—FULL LINE

IRON, STEEL and HARD-DRAWN COPPER WIRE, Delivered at Lowest Prices.

☞ ESTIMATES FURNISHED. SEND FOR CATALOGUES AND PRICES. ☜

Cincinnati, Ohio, U. S. A.

AMERICAN
Electric Mfg. Company.

EXECUTIVE OFFICES:

Western Union Telegraph Co.'s Building, cor. 23d Street and 5th Avenue,

FACTORY AND WAREROOMS:

163-165 WEST 18th STREET, N. Y.

This Company is engaged in the manufacture of DYNAMO MACHINES and LAMPS, and the construction of ELECTRIC LIGHTING STATIONS for lighting CITIES and TOWNS under the well-known

"AMERICAN SYSTEM"
OF ELECTRIC ARC LIGHTING,

(Wood's Patents.)

SPECIAL ADVANTAGES OF THIS SYSTEM. Completeness, durability, steadiness, quality of light and economy of power. The Wood dynamo-electric generator occupies less space, is lighter, requires less motive power, and costs less than others capable of producing an equal number of lights. There is less firing or flashing of the commutator, and consequently less loss of energy and wearing of the parts from this cause than is the case with other machines. It requires no oiling or other attention than to be kept clean, and its extreme simplicity enables it to be operated with the minimum of skill and attention. The current regulator and signalling apparatus, by which the machine is made to generate the exact current required for any number of lights from one to its full capacity—as they are turned off and on without change of speed or waste of power—is simple, effective, and safe. Its lamps are reliable in operation, the carbon-regulating mechanism being absolute in its control, durable, and unaffected by changes of temperature or weather. They are of ornamental design, and the steadiness and purity of light produced are unequaled at the same expenditure of power.

ESTIMATES FURNISHED For Central lighting stations, or isolated plants, for either the American Arc Lighting System or Edison Incandescent System, or for both combined.

SPECIAL ATTENTION given to installing isolated plants in Mills, Factories, Shops, Railroad Buildings, &c.

CONSTRUCTION WORK. Proper construction and installation of central stations and isolated plants is of great importance to insure safety and economy. The American Company has done more of this work than any other company in the United States, and its work is known to be superior to that of other companies.

PATENTS. This Company owns and controls all the Patents and Inventions for electric lighting of James J. Wood, J. B. Fuller, and many others heretofore controlled by the Fuller Electrical Co., and the Fuller-Wood Electric Light Co., which include the foundation patents of the Gramme dynamo.

"Among the different systems of arc lighting may be mentioned the Brush, the Weston, the Schuyler, the Thomson-Houston, and the Fuller-Wood (hereafter to be known as the American). The Fuller-Wood system of arc lighting has gained a world-wide reputation for reliability and economy. This organization was originally known as the Fuller Electrical Company, which dates its existence from 1878. This system was the foundation of the well-known Gramme Association, being the party of the first part in the articles of association, which was composed of the Brush, Weston, United States, Thomson-Houston, Edison and Joblnoff companies, which was good evidence that all the companies composing that association were willing to pay tribute to the superior merit of the Fuller Wood system.—*N. Y. Sun, Sept. 27th*, 1885.

ILLUSTRATED PAMPHLET AND DESCRIPTIVE CIRCULAR FREE. ADDRESS,

AMERICAN ELECTRIC MFG. COMPANY,

Western Union Telegraph Building, cor. 23d Street and 5th Ave., New York.

HARD RUBBER.

For all Electrical Purposes. In Sheets, Rods, Tubes, and special designs as ordered when practicable. Rubber Hook Insulators, Window Tubes with Heads, Key Knobs, Switch Handles, Plug Handles, Battery Cells, Battery Syringes, Electric Lamp Switch Handles, &c., &c. Manufactured by

THE BUTLER HARD RUBBER COMPANY,

33 MERCER STREET, NEW YORK.

THE ELECTRICAL SUPPLY CO.,

MANUFACTURERS OF

ELECTRICAL GOODS

OF EVERY DESCRIPTION.

Insulated Wires and Cables a Specialty.

LATEST IMPROVED DIAMOND CARBON BATTERY,

THE BEST OPEN-CIRCUIT BATTERY MANUFACTURED.

The Wallace Diamond Carbons.

ELECTRIC LIGHT SUPPLIES A SPECIALTY.

WAREHOUSES,

17 DEY ST., NEW YORK, 171 RANDOLPH ST., CHICAGO.

The Ball System of Electric Lighting.

We are prepared to furnish Electrical Apparatus for Lighting Streets, Squares, Mills, Factories, Railroad Depots, and Buildings, Hotels, Steamboats, Warehouses and places generally where perfect illumination is desired.

The Unipolar Dynamo is the Invention of Mr. Chas. E. Ball, of Philadelphia.

The novelty of the Ball system is in the dynamo, which possesses merits peculiar to itself alone, and I different from anything hitherto constructed. It has two armatures, each rotating within the inductive influence of ONLY ONE POLE of a field magnet. It is constructed with less material, has lower internal resistance, and to give equal results requires less power than any other dynamo. The current is very regular and produces a steady and uniform light. Two circuits of lamps, arc and incandescent, may be sustained at same time, or either run independently. It does not generate excessive heat in its armatures, and consequently requires no cooling device or ventilating apparatus. **It possesses the prevention and requires no cure.**

THE BALL ELECTRIC MANF'G CO. [Limited],

H. M. FRENCH, General Agent,

63 EQUITABLE BUILDING, BOSTON, MASS.

The MATHER ELECTRIC CO.

Manufacturers of

COMPLETE SYSTEMS OF

ELECTRIC LIGHTING

NOTICE.

The Thomson-Houston Electric Co.

OF CONNECTICUT,

HAVING AN OFFICE AT BOSTON, MASS., RESPECTFULLY NOTIFIES ALL PARTIES MANUFACTURING OR DEALING IN ELECTRIC LIGHT APPARATUS, THAT IT OWNS, AMONG OTHERS, THE FOLLOWING EXISTING LETTERS PATENT OF THE UNITED STATES, VIZ:

Thomson & Houston, March 1, 1881, Current Regulator for Dynamo-Electric Machines, No. 238,315.

Elihu Thomson, Oct. 10, 1882, Regulator for Dynamo-Electric Machines, No. 265,937.

Elihu Thomson, Dec. 26, 1882, Regulator for Dynamo-Electric Machines, No. 269,606.

Elihu Thomson, Feb. 6, 1883, Electric Current Regulator, No. 271,948.

The above patents fully cover the principle and methods of automatically regulating the electric current without the use of variable resistances, and without waste and loss of power. By these inventions all irregularities in speed of engines are compensated for and any number of lights can be freely turned on or off at will without any attention to either dynamo or regulator. These advantages are possessed by no other system of electric lighting, and upon such advantages depend almost entirely the profits of local electric lighting companies.

We hereby notify all manufacturers, purchasers or users of electric lighting apparatus that any violation or infringement of the above-named patents will be prosecuted to the fullest extent of the law.

THE THOMSON-HOUSTON ELECTRIC CO.,

131 DEVONSHIRE ST., BOSTON, MASS.

Insulated Electric Wires.

TELEPHONE CORDS.
SWITCH-BOARD CORDS.
ELECTRIC LIGHT WIRE.
MAGNET WIRE.
RESISTANCE WIRE.
OFFICE and
ANNUNCIATOR
WIRE.
INSULATING TAPE.
KERITE WIRE.
OFFICE CABLES.

Patent Lead Taped Wire and Cables.

WESTERN ELECTRIC COMPANY.

227-251 So. Clinton Street, Chicago.

70-76 Trinity Place, New York.

59 Moorgate Street, London, E. C.

33 Rue Boudewyns, Antwerp.

ELECTRICAL NOVELTIES INTRODUCED!
Parties desiring to introduce new electrical appliances in Providence and vicinity should address:
PROVIDENCE ELECTRICAL SUPPLY CO.,
Manufacturers and Dealers in
ALL KINDS OF ELECTRICAL SUPPLIES,
56 Washington St., PROVIDENCE, R. I.
ELECTRIC BELLS A SPECIALTY.

William Marshall,
Manufacturer of ELECTRICAL CONDENSERS
MAGNETS CHARGED, ETC.
Rooms 2 and 4 University Building,
Corner Waverley and University Places, New York.

MODEL and EXPERIMENTAL WORK A SPECIALTY.
Send for Circulars.
C.E. Jones & Bro.
CINCINNATI, O.
(Mention this Paper.)

UNION ELECTRIC CO.,
1 ANN ST., NEW YORK.

ELECTRIC SCARF PIN, $2.
Great Novelty. Weight only 6oz.
Live Agents Wanted. Outfit, $2.
POCKET BATTERY

Gold and Silver Electro-plating Apparatus and Outfit,
For JEWELERS, STUDENTS, AMATEURS, ETC.,
FROM $4.00 to $9.50
SEND STAMP FOR CIRCULARS.

DIRECT READING
AM-METERS, VOLT-METERS, VOLT-AM-METERS AND MILL-AM-METERS,
(A. K. EATON'S PATENT)
ALSO
Electrical Instruments of all kinds.
Manufactured and for sale by
A. K. EATON,
63 and 65 HENRY STREET,
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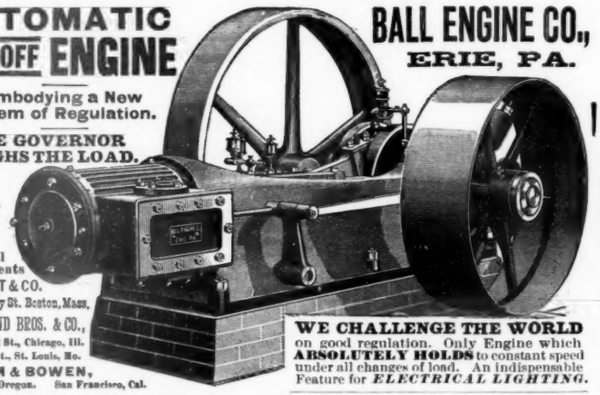

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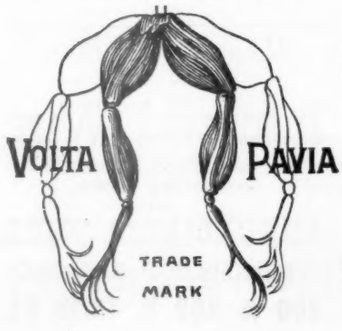

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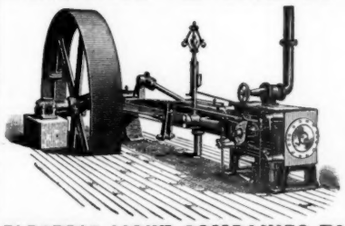

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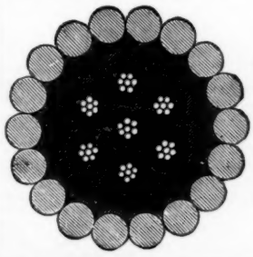

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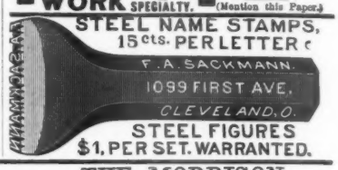

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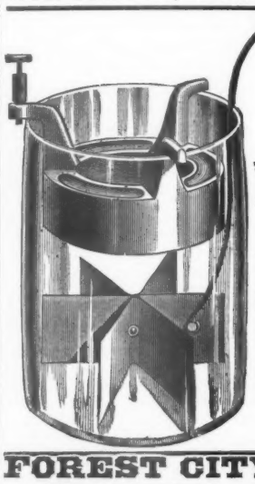

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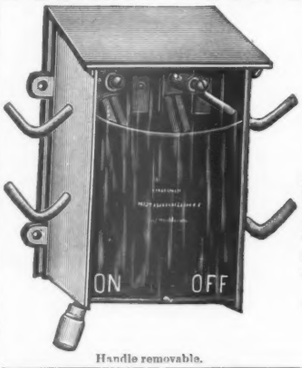

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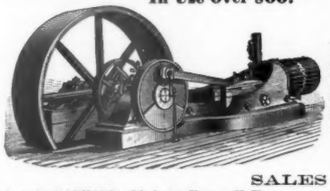

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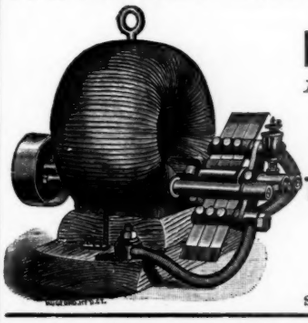

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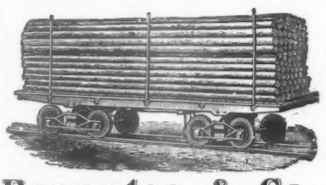

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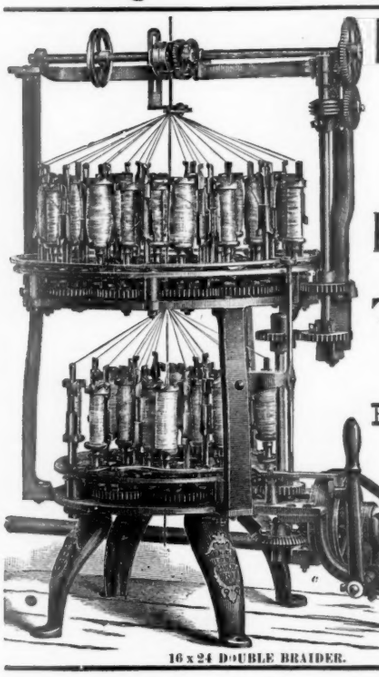

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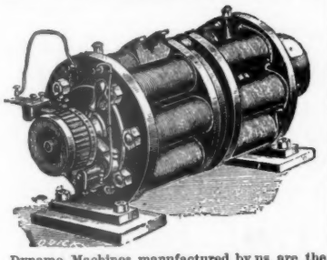

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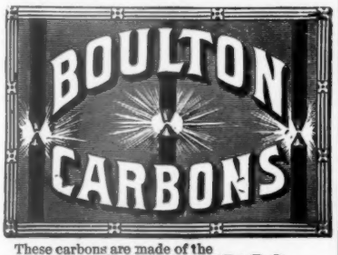

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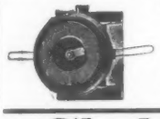

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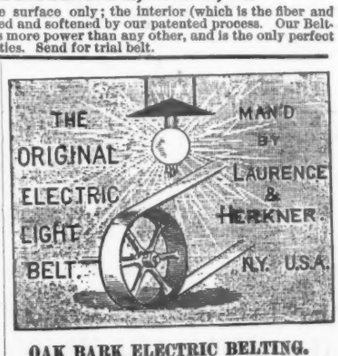

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